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The effects of moderator variables on the reliability of composite measures and the evaluation of causal relationships

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TABLE OF CONTENTS

CHAPTER 1. INTRODUCTION

> If the actual knowledge acquired by science at any time were looked at a hundred years later much of it would turn out to be only partially true, and much actually false. Only the newer body of knowledge would then be thought of as science, and it in turn will be superseded by a still newer body.
> -Ralph Ross, Symbols and Civilization, 1962: 9.

The principle objective of a science, other than the description of empirical phenomena, is to establish theoretical formulations by which the phenomena can be explained, accounted for and predicted (Torgerson, 1958: 1). The increased acceptance and growing body of knowledge of causality and causal models as a means of achieving the interrelated explanatory and predictive functions of theory has been accompanied by a movement toward more "sophisticated" analytical methodologies as a means of approximating the "ideal" experiment in causal analysis. The trends toward path analysis and regression models as a basis for causal inferences necessitates that careful attention be devoted to the problems inherent in social science data or data analyses procedures such as: (1) reliability and errors of measurement and the accompanying attenuation of causal parameter estimates; and (2) the possibility that the relationships of concern may be spurious or that different prediction patterns or causal processes may exist within different components of the research population. Of particular importance to sociological research is

the problem of measurement error as indicated by Blalock (1969b: 116) in emphasizing that progress in any scientific endeavor ultimately depends on the accuracy and adequacy of its measurement procedures.

Recent work in educational and industrial psychology has focused on the concept of moderator variables (Saunders, 1956; Ghiselli, 1960, 1963; Fredericksen and Melville, 1954 and Hobert and Dunnette, 1967) as a means of increasing the efficacy of predicting educational and occupational success. The primary assumption underlying the application of the moderator variable to measurement theory is the recognition that subgroups of research populations can be differentiated with respect to errors and, thus, reliability and validity of measurement. An analogous subgrouping procedure employed in sociology in examining substantive differences (Kendall and Lazarsfeld, 1950; Hirschi and Selvin, 1967; Sample and Warland, 1973; Cosby and Picou, 1972 and Forbes and Tufte, 1970) is founded on the premise that subpopulations can be distinguished with respect to: (1) the strength and direction of causal relationships; (2) the relative importance of variables; (3) differential causal or predictive processes underlying the phenomena of concern; and (4) differential magnitudes of explained variation in the dependent variable(s). This approach is also suggested as one means of dealing with the spuriousness problem in causal relationships.

The existence of substantively and statistically distinguishable subgroupings of research populations has generally been recognized in the social sciences. This theoretical and intuitive recognition has been applied to some degree, as indicated above, in: (1) the analysis and interpretation of causal relationships; and (2) the formulation of reliable and valid measurement instruments. Both of these considerations are primarily concerned with the same phenomenon, namely; the identification of independent population control or contextual variables which systematically influence the covariation between variables or scale items. However, this analogous recognition does not appear to have been considered simultaneously at all levels of the social research act. That is, the existence of differentiable sub-populations has been considered in the analysis and interpretation of observed relationships but not in procedures utilized in obtaining the observations and vice versa.

Objectives

The overall objective of the dissertation is concerned with the theoretical and methodological implications of applying the moderator variable technique to different levels of the research act, that is at the level of theory, measurement and analysis.

The specific objectives of the dissertative inquiry are to:

1. substantively identify social-psychological or demographic variables which are hypothesized to function as moderator variables in the research population of concern;

2. comparatively assess the effects of the moderator variables on the reliability coefficient estimates and other scale analysis properties;

3. assess the comparative effects of subgrouping research populations on the strength and direction of causal relationships and coefficient(s) of determination in a causal model; and on the interpretations derived therefrom;

4. analyze the implications of moderator variables as a means of more closely approximating the assumptions of causal analytic techniques such as linear regression; and

5. assess the comparative approach utilized as a viable alternative to the "ideal" experiment in causal analysis.

The achievement of these objectives is primarily on the exploratory and descriptive level in attempting to gain additional insights into the operation of moderator variables and the potential usefulness of subgrouping in social research and theory development. Analysis of variance and covariance procedures are utilized in statistically testing the equality of the estimates of measurement reliability and causal parameters obtained by subgrouping a sample of local civil defense director/coordinators[1]. A causal model of organizational

[1]See Klonglan et al. (1966).

effectiveness developed in a previous study (Mulford et al., 1972a) is utilized as the framework in assessing the effects of moderator variables on causal relationships, composite measures and explained variation in the dependent variable(s).

Importance of the Study

Admittedly the primary orientation of the dissertation is methodological but this does not necessarily imply that it is atheoretical for as Hill (1970: 13) argues, the distinction between theory and methodology is totally artificial at the level of actual research. In accepting the distinction at the analytic and highly abstract level, Hill (1970: 13) argues further that

> ...the established predilection of methodologists to accept the distinction and view their specialty as something apart from substance has been dysfunctional for sociology and especially for the development of a methodology which has a high degree of utility to the investigation of crucial sociological problems.

The position of the dissertation in this respect is that suggested by Denzin (1970: 5) in holding that methods are of considerable relevance to theory and in fact

> ...every method has a different relevance for theory, and that significant advances in substantive sociological theory will occur only after sociologists adopt a consistent and viable framework for the dual analysis of theory and method.

The moderator variable technique is suggested as being a methodological advance for the measurement of sociological variables and their subsequent analyses in causal relation-

ships. The author, therefore, suggests that this approach is consistent with Blalock's (1968a: 5) recommendation that the extent to which the sizable gap between sociological theory and actual empirical research can be closed is dependent on "a more or less steady improvement of research techniques, on the one hand, and theory, on the other". A functional rather than a static bridge based on the continuous interaction between theory and research (Dubin, 1969: 2) is necessary if sociology is to achieve closure on this sizable gap.

Both theory and research should, thus, play active rather than passive roles in the sociological act wherein theory functions in the initiation, design, prosecution and interpretation of empirical inquiry and research serves in the role of clarifying concepts, refining, initiating and refocusing social theory (Merton, 1967: 157-171). In emphasizing "theories of the middle range" which mediate between empirical generalizations and overall grand theories as a means to advance sociological theory, Merton (1967: 171) states that

> ...an explicitly formulated theory does not invariably precede empirical inquiry, that as a matter of plain fact the theorist is not the lamp lighting the way to new observations. Nor is it enough to say that research and theory must be married if sociology is to bear legitimate fruit. They must not only exchange solemn vows - they must know how to carry on from there. Their reciprocal roles must be clearly defined.

CHAPTER 2. CAUSE AND CAUSAL MODELS

> The rules of evidence and inference are common to all sciences. A science moves from the possible to the plausible to the probable.
> -Borgatta, Sociological Methodology 1969: xi.

Scientific explanation as indicated by Doby (1969: 147) depends on four levels of explanation in linking two interrelated bodies of knowledge - empirical law or data and theoretical laws or theories. The first level is concerned with determining that a phenomenon of a problematic nature exists, whereas the second level focuses on describing what the phenomenon is. The third and fourth levels respectively focus on how the factors interact to create the problematic phenomena and on why the effects observed are produced (Doby, 1969: 148-150). These four levels of explanation are encompassed by the four purposes of research posited by Selltiz et al. (1959: 50). The exploratory or first purpose is concerned with gaining familiarity with a phenomenon whereas the second descriptive purpose focuses on a portrayal of the characteristics of the social phenomenon. The determination of the frequency with which something occurs or with which it is associated with something else is the basis of the third research purpose whereas the fourth type of research focuses on testing causal relationships between variables (Selltiz et al., 1959: 50-51). The achievement of the explanatory and predictive functions of theory increase as one

moves from the first level or purpose of research - the exploratory in determining that something exists - to the third and fourth levels - the associational and causal - in answer to the why and how types of explanation (Doby, 1969: 151-152) at the same time increasing rigor and accuracy at the empirical level are required in attempting to meet the assumptions of the data analyses procedures utilized as a basis for valid theoretical inferences.

Of central concern in the dissertation is the extent to which the moderator variable technique can be validly used in sociology as a means of alleviating some of the problems encountered in meeting the measurement, analytic and other assumptions accompanying the analysis of causal relationships and causal models as a theory building procedure. The remainder of this section is, therefore, concerned with a discussion of the notions of causality, the criteria underlying the establishment of causality and the assumptions accompanying inferential statements of cause and effect.

Causality

The increasing emphasis on prediction as a means of social intervention (Lerner, 1965: 9) has been accompanied by an increased acceptance and cumulation of causal theories and models as a means of achieving both explanations and predictions (Doby, 1969: 14). The general notion of causality has,

however, been subjected to a variety of epistemological and philosophical criticisms as to the admissibility of cause as a scientific concept.

The inability to discover or perceive "cause" in the real world has been one of the major epistemological arguments against the introduction of cause into the scientific discourse (Francis, 1961: 54) wherein cause is regarded as more of property of the researcher than of empirical reality as noted by Blalock (1968b: 156-162) in that: (1) causality can never be verified empirically and (2) the notion of cause and effect is far too simple to describe reality. Blalock (1964a: 11 and 1968b: 161), in accepting the validity of these objections indicates that the problem of causal thinking is part of the much larger question of the nature of the scientific method - that of the sizable gap between the ideational theoretical language and the sensate operational language of the researcher. Causal thinking as a heuristic device (Rhoads, 1971: 30) belongs on the abstract theoretical level to aid in the development of hypothetical causal models whose implications are only indirectly testable (Blalock, 1964a: 6). In likening causality to "forcing" or "producing" Blalock (1968b: 161-162) indicates that

> ...in a very real sense no theoretically defined concepts can be directly translated into operations, nor can theoretical propositions be directly tested empirically. Yet it remains exceedingly difficult

> for most persons to think without the aid of such notions as forces, causes, producing agents....

The asymmetric or antecedence assumption implicit in the notions of cause, forces and producing agents has been criticized from an interactionist perspective wherein symmetrical, reciprocal models of human behavior are held to be more appropriate (Rhoads, 1971: 32). In contradistinction to the concepts of relative emergence which holds that social phenomena are nonpredictable and that the systematic correlation between variables in no way implies that the relationship is a product of some causal process(es), a fruitful research and theoretical strategy as indicated by Woolridge (1971: 77) assumes that all variation in the observed variables is causally produced. In reacting to the asymmetry - symmetry debate, Simon (1957a: 11-12) argues that

> ...the question, then, of whether we wish to retain the word "cause" in the vocabulary of science may be boiled down to the question of whether there is any meaning in the assertion that the relationship between two variables in a model is sometimes asymmetrical rather than symmetrical. If the answer to this question is in the negative, there would seem to be good reason for abandoning "cause" in favor of its synonyms. If the answer is affirmative, the term "cause" carefully scrubbed free of any undesirable philosophical adhesions can perform a useful function and should be retained.

The causal question as indicated by Lerner (1965: 7) can be safely ignored as long as there is no doubt that the variable relationship under consideration is indeed symmetrical. However, except for the impossibility of the presumed effect

preceding its cause, Bunge (1959: 62-68) indicates that the notion of temporal sequences implicit in the asymmetrical assumption does not rule out the possibility of instantaneous links between cause and effect in favor of a finite time log between the effect relative to its cause.

The isolation of the causal relationship from its surroundings is an empirical and theoretical indispensibility for the application of causal ideas (Bunge, 1959: 129). Wholists, as indicated by Bunge (1959: 129), argue that such a procedure damages the totality concerned but "analysis is the only method known of obtaining a rational understanding of the whole: first it is decomposed into artificially isolated elements, then an attempt is made to synthesize the components". Further to this Blalock (1964a: 13) indicates that

> ...a causal relationship between two variables cannot be evaluated empirically unless we can make certain simplifying assumptions about other variables.

In emphasizing the conditional nature of causal relationships Bunge (1959: 35) suggests that the hypothetical nature of causal statements refer to idealized models of reality of the "if-then" form in that a scientific statement "does not express what happens but what would happen if certain conditions were met". The most useful scientific laws are those which do not refer to specific concrete events but are of a more general "if-then" nature as indicated by Blalock (1964a:

13) in stating that "if a system is isolated or if there are no other variables operating, then a change in A produces a change in B". This, however, presupposes that a probabilistic rather than a deterministic mode of thought with respect to cause and effect is more realistic.

The indeterminancy and uncertainty of effects, future states or events has been the basis for one criticism of the causal notion in the social sciences. Simon (1957a: 11) indicates, however, that "the viewpoint is becoming more and more prevalent that the appropriate scientific model...is not a deterministic but a probabilistic one". The probabilistic trend does not alleviate the concept of causality but reformulates it (Lerner, 1965: 17) in that empirical information in evaluating a causal statement is never exact but statistically distributed around average values (Bunge, 1959: 71). In adopting the probabilistic notion it is also possible as Simon (1957a: 11) suggests

> ...to replace the causal ordering of the variables in the deterministic model by the assumption that the realized values of certain variables at one point or period in time determine the probability distribution of certain variables at later points or periods.

The causal statement linking two or more variables then essentially implies as indicated by Woolridge (1971: 78) that in the manipulation of the independent or causal factor then, ceteris paribus, the probability that the dependent variable(s)

will assume some value(s) in the future will be affected. As a result the concept of causality as a theoretical device is freed from the deterministic notion that effects are equivalent to observed changes.

Despite the epistemological and philosophical skepticism accompanying the causal concept it is a difficult notion to ignore in scientific enquiries. In view of the common usage of the term and the extent to which some notion of causality is implied in theoretical propositions (such as the greater the X the greater the Y) it is difficult if not impossible to avoid the assumption that some kind of causal relation does in fact exist as indicated by Sjoberg and Nett (1968: 27) in stating that

> ...implicit in the application of the scientific method is the notion that some events occur prior to or concurrently with others and that the former have an impact on the latter, thereby, generating or causing specific reactions.

Empirical Criteria of Causality

In recognition, in accordance with Blalock (1964a: 62), that causality can never be demonstrated from empirical observation, does not necessarily imply that causal inferences cannot be made concerning the adequacy of hypothetical causal statements. Hirschi and Selvin (1967: 38) in following the work of Hyman (1955) indicate three minimal empirical requirements that must be met in order to validly infer that a causal

relationship exists between two variables. These are:

1. the two variables are statistically associated,

2. a causal order exists in the hypothesized relationship, and,

3. the association between the two variables does not disappear when the effects of other variables causally prior to both of the original variables is removed.

The negation of any of these criteria is sufficient to establish noncausality (Hirschi and Selvin, 1967: 115). Although referring primarily to bivariate dichotomized relationships these criteria do have general applicability to multivariate causal models to be considered later. The author also suggests that an understanding of the logic underlying these criteria (particularly the latter two) is essential for and explicates to some degree the assumptions of multivariate causal inferences. In addition an understanding of the logic is also necessary for the moderator variable approach being developed in the dissertation. An elaboration of these criteria is therefore as follows.

The first criteria, which is the most commonly accepted basis for inferring causality indicates that the variables are correlated whereby observed variations in the independent or causal factor are associated with observed variations in the dependent variable(s). However, it is necessary to recognize as argued by Simon (1954: 467) that "correlation is no proof

of causation" but is only the first link in plausibly inferring causality (Hirschi and Selvin, 1967: 115). The second criterion concerning the causal ordering indicates that independent (causal) variable is causally prior to the dependent variable in respecting the asymmetrical assumption of causality. This criterion necessitates that the researcher be able to order the variables on the basis of common sense, intuitive or temporal considerations. Often the order between variables is quite clear but due to the alterability and indeterminancy of causal orderings the same variable may be used as an independent (cause) and as a dependent (effect) variable in the same or different relationships. In other instances the order is inherently indeterminate. The key factor in attempting to comprehend the direction of causality as indicated by Rosenberg (1968: 10-11) appears to be susceptibility to influence in that influence in one direction is more probable than in the other direction for the particular phenomenon being considered.

The third criterion which is dependent in large part on the second focuses on the problem of spuriousness wherein a third variable antecedent to both of the original variables may account for the observed relationship. In differentiating between "true" and "spurious" correlations as a means of inferring "causality" or "noncausality", Simon (1954: 467) indicates that the main procedure employed is through the introduction of a third variable as a means of clarifying the

relation between the two original variables. The interpretation and legitimacy of utilizing partial correlation or regression as a statistical procedure for inferring "true" causality is dependent on a priori theoretical assumptions concerning the causal ordering of the variables under consideration as argued by Gordon (1968: 592-593). In a two variable relationship between X and Y with Z introduced as a control, the partial correlation $r_{XY \cdot Z}$ will vanish or approach zero in two different situations: (1) X←Z→Y; and (2) X→Z→Y (Blalock, 1962b: 331). Only in the former situation is a zero partial indicative of a spurious relationship, where Z is accounting for or explaining "the relationship between X and Y (Kendall and Lazarsfeld, 1950: 157). In the second situation the third variable Z is an intervening variable between X and Y which "interprets" the relationship or is a contingency which must exist if the relationship is to hold (Mueller et al., 1970: 200). The lack of spuriousness is the most difficult criterion to meet for at least two reasons: (1) pragmatic considerations limit the number of antecedent variables which can be "controlled" and a variable not yet considered may account for the original association (Hirschi and Selvin, 1967: 115). However as more antecedent variables are considered the truth claims for a causal relationship between X and Y become stronger; and (2) a vanishing or negligible partial correlation or regression coefficient may

be indicative of a "conditional" relationship wherein the direction and/or strength of the original relationship varies in accordance with differential levels of the antecedent variable (Kendall and Lazarsfeld, 1950: 157). This consideration will be more explicitly presented in Chapter 3 in the discussion of moderator variables.

Causal Models

The introduction of causal models as a means of diagrammatically and equationally embodying theoretical propositions in an explicit format and the accompanying clarification of causal analysis problems has been one of the most important advances in sociological methodology in the past decade (Land, 1972: 39).

In the generic sense the concept causal model as defined by Warren et al. (1968: 6) refers to any multi-variate system in which all variable relationships are hypothesized as being either noncausally or causally related in an indirect or direct manner. Three elements which Warren et al. (1968: 16-17) considered to be necessary before a causal model is complete are: (1) a verbal theoretical explanation or description of the causal relations among the variables in the system; (2) a diagrammatic representation of these relations; and (3)

a set of mathematical equations[1] representing the relations under consideration.

The underlying motives and purposes to be served through the development of causal models and their subsequent analyses appear to be:

1) the real world is too complex and needs to be conceptually simplified in order to comprehend it (Dubin, 1971: 58). Blalock (1964a: 7-15) in preferring to confine the notion of causality to hypothetical models of reality suggests that it is necessary to make a series of untestable simplifying assumptions whereby events can be repeated and properties made constant. These assumptions can never be empirically verified but are deemed necessary if generalizations are to be made beyond the single and unique event.

2) an extension of the bivariate or three variable causal analyses procedures developed by Kendall and Lazarsfeld (1950), Hyman (1955) and other sociologists to a

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[1]A linear recursive system of equations rather than simusimultaneous structural equations are used in this dissertation. In dealing only with one-way causation, recursive systems are more appropriate for causal interpretations than are more general structural systems (Blalock, 1968b: 165). In addition least squares solutions are applicable in obtaining unique estimates of the causal parameters. Recursive systems also reduce the flexibility of the mathematical systems inherent in structural systems in coinciding more realistically with the assumption of simple causal ordering (Blalock, 1964a: 53).

multivariate system whereby causal inferences can be obtained for direct[1] as well as indirect[2] relationships between all ordered variables in the theoretical system (Land, 1969: 16). At the same time it is possible to pragmatically evaluate the relative importance of the limited number of explanatory variables in terms of their accounting for the variation in the same dependent variable(s) (Blalock, 1961: 866), and

3) the explicitness with which verbal theories may be presented in diagrammatic and equational form for visual appraisal and statistical analyses.

Assumptions and Criteria of Causal Model Analyses

The assumptions inherent in the empirical evaluation of multivariate causal models in deriving unique and unbiased estimates of causal parameters through the application of the general linear regression model or variants thereof are presented below with a limited discussion. A more detailed presentation of several of the assumptions is presented in

[1]A direct relationship (written X→Y) is said to exist when if and only if a change in X produces a change in the mean value of Y (Blalock, 1964a: 19).

[2]An indirect causal relationship (written X→Z→Y) refers to a situation where X (the initial or antecedent cause) has an effect on Z (the intervening or intermediate variable) which in turn produces a final effect on the dependent variable Y (Blalock, 1964a: 20).

Chapters 3 and 5. The assumptions which encompass in large part the previously cited criteria for bivariate causal relationships are that:

1) all relationships are linear and additive or can be made to be so through the use of the appropriate transformation procedures (Land, 1969: 32-33). Previous research in a particular research area or point plotting are suggested by Land (1969: 32) as bases for evaluating the tenability of this assumption with respect to a specific set of data. Land (1969: 32) indicates further that a relationship may not be linear throughout its entire range but linearity may be present within the range of values under consideration.

2) the level of measurement is at least interval. Considerable controversy has been raised with respect to this assumption as part of the larger "strong statistics -- weak measurement" issue raised by Stevens (1967). Labovitz (1967: 159-160), in arguing that statistical techniques are not ends in themselves, indicates that the assumptions accompanying these techniques are not inviolate but are aids to be used in the interpretation of results. In suggesting the application of statistical techniques assuming interval properties to ordinal data, Labovitz (1968: 544) indicates that such a procedure yields: (1) more sensitive tests; (2) more interpretable results; (3) greater retention of information available; (4) statistics with known sampling error; and (5)

results that are related to other statistical techniques that may be beneficial to the analyses. The suggestions by Labovitz who indicates that the resultant errors are not serious have been the subject of considerable controversy but as indicated by Kerlinger (1964: 427) "it is a goal of scientific measurement to construct and use interval and ratio scales". In the present state of measurement where the equality of intervals cannot be assumed Kerlinger (1964: 427) further suggests that "the best procedure would seem to be to treat ordinal measurements as though they were interval measurements but to be constantly alert to the possibility of gross inequality of intervals".

3) the error term in any one equation consisting of measurement error on the dependent variable and the effect of variables excluded from the model is uncorrelated with all independent variables in the model (Blalock, 1969a: 49). Encompassed within this assumption are several causal criteria cited previously such as (1) the relationship between the independent and variable is nonspurious in that all other unmeasured variables which may be causes of the dependent variable are held constant or can be safely ignored; (2) an isolated system in permitting an empirical evaluation of the causal relationships in respecting the hypothetical "if-then" form of causality; and (3) the excluded variables (Blalock, 1964a: 13) do not systematically influence the relationships

between the dependent and the independent variable(s) (Blalock, 1964a: 19).

4) measurement errors in all variables are negligible. The presence of measurement error in both dependent and independent variables tends to attenuate or obscure the "true" relationship as estimated by correlation and path coefficients (Bohrnstedt and Carter, 1971: 134) whereas the regression coefficient is attenuated by errors in the independent variable (Johnston, 1972: 283 and Bohrnstedt and Carter, 1971: 134). In addition, the power of statistical techniques such as the analyses of variance may be lessened as indicated by Cleary, Linn and Walster (1970: 131). The attenuation problem tends to be cumulative in multivariate relationships as indicated by Heise (1969: 59) and Bohrnstedt (1969: 122-123) in that low reliability in one variable will affect not just one causal parameter but several. Generally speaking the reduction in the magnitude of the estimated parameter as suggested by Blalock (1966: 42) will be a function of the amount of measurement error relative to the total variation in the independent variable (in the case of regression estimates). The undesirable effects of errors of measurement on the estimation of causal parameters and tests of statistical significance will be considered more comprehensively in Chapter 3 of the dissertation. As one of the central concerns

in the dissertation one procedure for overcoming low reliabilities of measurement is discussed in Chapter 3 along with a statistical technique to alleviate the complex attenuation problem in multivariate analyses and (5) the model is theoretically correct in conforming to "reality" with respect to the causal ordering of all relevant variables (Heise, 1969: 66). The consequences of an erroneous model, as argued by Heise (1969: 66) are worse than ignorance. This assumption encompasses the partialling fallacy presented previously. A knowledge of the temporal or causal ordering of the variables is essential in distinguishing a spurious relationship where the partialled variable is antecedent to both of the other variables from an "interpretive" or "contingent" relationship where the partialled variable intervenes between the other variables.

The major empirical criteria in assessing the validity or efficacy of a causal model are: (1) the degree of congruence between the predicted and observed outcomes (Dubin, 1971: 320), and (2) the magnitude of the squared multiple correlation coefficient (R^2) between the dependent variable(s) and the independent variables in the model (Schuessler, 1971a: 320). The major criterion in sociology due to the nature of the research design is the R^2 value which indicates the proportion of the total variation about the mean of the dependent variable explained or accounted for by the inde-

pendent variables in the causal model.

Due to the low R^2 values observed in empirically evaluating sociological models and the tenuous nature of several of the assumptions underlying the analytic techniques when applied to sociological data, the dissertation is concerned with attempting to overcome these problems. In particular the dissertation focuses on increasing the complexity of causal models through the moderator variable technique as a means of more realistically meeting the assumptions concerned with: (1) high reliability of independent variable measurement; (2) the random and noniteractive effects of excluded variables; and (3) the nonspuriousness of hypothesized causal relationships. In addition moderator variables are viewed as one procedure for more closely approximating the "ideal" experiment in causal analyses.

CHAPTER 3. MODERATOR VARIABLES: METHODOLOGICAL CONSIDERATIONS

In the generic sense, the moderator variable encompasses several analogous social science concepts and techniques utilized as means of increasing the validity of prediction models, to increase the reliability of social measurement and as a basis for more valid causal inferences. In introducing the moderator variable into industrial and educational psychology, Saunders (1956) contends that there are many situations in which the efficacy of psychological measurement or prediction models varies systematically in accordance with independent variables other than those being considered. In recognizing the inaccessibility of validity coefficients greater than .50 in predicting educational and occupational success (Zedeck, 1971: 295), modifications in the classic prediction and measurement theories were generated due to the interactive effects between individual social-psychological attributes and errors of measurement (Ghiselli, 1960 and 1963).

Kendall and Lazarsfeld (1950) and subsequent researchers (Glock, 1967; Hirschi and Selvin, 1967 and Rosenberg, 1968) introduced the notion of test factors or qualifier variables in sociology as a means of specifying the conditions under which a bivariate causal relationship is strengthened or weakened. Other researchers (Cosby and Picou,

1972; Forbes and Tufte, 1970 and Sample and Warland, 1973) in analyzing multivariate causal models have postulated that research population subgroups can be differentiated with respect to the causal processes underlying a particular social phenomenon or with respect to the strength of the causal relationships of concern.

The above cited approaches are all primarily concerned with the same methodological procedure; namely the identification of independent population control or contextual variables which systematically influence the correlation between variables or the reliability and validity of measurement procedures. The application of the moderator variable approach to causal model analyses whereby the total research sample is stratified into subgroups recognizes different types of people within the sample (Cleary, 1966: 216). This cognizance as indicated by Pasanella (1972: 379) suggests that individuals are best described as possessant of constellations of variables which may differ from person to person. The effects of moderator variables may best be conceptualized in terms of their sorting heterogenous aggregations of individuals into homogenous groups with respect to: (1) errors of measurement (Ghiselli, 1963: 83); and (2) the most appropriate regression line or equation (Velicer, 1972b: 266). Concomitantly it is possible to introduce a greater degree of complexity into causal analyses in order to more adequately approximate the

assumptions accompanying these procedures. The remainder of this section is, therefore, devoted to a discussion of the degree to which moderator variables may contribute to alleviating the problems of unreliable measurement, nonexperimental data sources, and the tenability of causal inferences.

Moderator Variables and Measurement Theory

The movement towards more sophisticated methodologies accompanying causal analyses and inferences requires that careful attention be focused on the problem of social measurement as argued by Blalock (1969b: 116) in indicating that

> ...we all know intellectually that progress in any scientific field ultimately depends on the adequacy of its measurement procedures.

Blalock (1969b: 115) indicates further that certain inadequacies in our measurement procedures may be the major obstacle to be overcome if sociology is to become a "hard" and disciplined social science. In support of this point of view Hauser (1969: 127-128) indicates that

> ...it is inadequate measurement, more than inadequate concept or hypothesis, that has plagued social researchers and prevented fuller explanations of the variances with which they are confronted.

In discussing the substantial unexplained variation encountered in evaluating theoretical models, Blalock (1968b: 157) indicates that there are at least three obvious possi-

bilities with different implications for theory building and research strategies. First, the wrong set of independent variables may be involved and if the correct variables were located a higher percentage of the variation in the dependent variable could be explained. Secondly, it may be necessary to increase the complexity of the theoretical models in order to simultaneously consider a larger number of variables which may be operating more or less independently of one another. The third methodological implication suggested by Blalock (1968b: 157) which is of central concern to this discussion is that the correct variables may be involved, but most of the unexplained variation is due to inadequate measurement. Accurate precise measurement becomes particularly crucial in attempting to ascertain the relative causal influence of highly interrelated independent variables (Blalock, 1969b: 117) and in attempting to select from among alternative theoretical models with equal plausibility or to modify those models which appear most adequate (Blalock, 1968a: 6).

It is generally recognized that most sociological variables are measured with considerable error due in part to the sizable gap between sociological theory and empirical research (Blalock, 1968a: 5) and in part to the indirect nature of sociological measurement in quantifying sociological attributes (Blalock, 1968a: 19-23). In the actual analyses and interpretation of data it has been presupposed that measure-

ment errors are negligible in comparison to the errors produced by variables omitted from the theoretical model and can thus be safely ignored (Blalock, 1964a: 49-50 and Blalock, 1966: 37). Recent emphasis devoted to the problems of measurement have developed as indicated by Borgatta (1969: xiii) in response to: (1) increased attention focusing on techniques of building scores; and (2) the questioning of assumptions underlying statistical procedures and the relevance of these procedures for sociological analyses. These concerns would appear to be related to the necessity of improving measurement rather than on attempting to live with poor measures due to the undesirable effects of unreliable measures on: (1) the robustness of parametric statistics; (2) the estimates of causal parameters (Bohrnstedt and Carter, 1971: 132); and (3) the inability to accurately separate out the hypothesized causes of a phenomenon into their component effects (Blalock, 1970: 88). As indicated previously in Chapter 2, the presence of measurement error in both dependent and independent variables attenuates or obscures the true lawfulness of nature of correlation and path coefficients (Bohrnstead and Carter, 1971: 134) whereas the regression coefficient is attenuated by errors in the independent variable(s) (Johnston, 1972: 283 and Rao and Miller, 1971: 181). The attenuation problem is further complicated in multi-variate models in that one variable measured with low reliability may

not only affect the estimate of one causal parameter but several (Heise, 1969: 59). In addition Cochran (1970: 30) and Bohrnstedt and Carter (1971: 137) indicate that errors of measurement may reduce or attenuate the coefficient of determination (R^2) as a function of the reliability of measurement, and, thus, may in large part explain the relatively low R^2 values observed in the social sciences. Given the undesirable effects of errors of measurement on parameter estimates and tests of statistical significance, an important factor in research design becomes the development of reliable and valid measures as a means of alleviating these problems but also in providing reliability estimates to be used in statistical procedures such as correction for attenuation or errors-in-variables.

A meaningful approach to these problems appears to be the moderator variable which modifies classic measurement theory. Classic measurement theory indicates that an individual's observed score is a function of the individual's true score for the particular attribute of concern plus an error component[1] (Bohrnstedt, 1970: 82) symbolized as

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[1]Measurement error may be in form of systematic bias or random errors. Systematic or nonrandom errors are generally not considered to be important in most measures and when recognized may be reduced in magnitude or ruled out on probability grounds due to their predictable pattern. The major focus is, thus, placed on random errors due to their presence and unpredictable behavior in the majority of social measures (Blalock, 1966: 37 and Ghiselli, 1964: 212-213).

$$X_i = T_i + e_i$$

where X_i = observed score

T_i = true score

and e_i = measurement error.

In recognizing the fallibility of measurement the theory assumes that as the number of parallel tests administered to one individual increases indefinitely that: (1) the errors tend to cancel one another with an expected value of zero; (2) the errors on one test are uncorrelated with the errors on other tests; and (3) the errors on one test are uncorrelated with their respective true scores or with the true scores on other tests (Nunnally, 1967: 182). Symbolically these assumptions are:

(1) $E(e_i) = 0$

(2) $\rho T_i e_j = 0$

(3) $\rho T_i e_i = 0$ and $T_j e_i = 0$

(Bohrnstedt, 1970: 82). On the basis of these assumptions whereby any covariance terms are eliminated, the variance of observed scores, as indicated by Bohrnstedt (1970: 82), is simply the sum of the true score variance and the error variance or

$$\theta_{x_i}^2 = \theta_{T_i}^2 + \theta_{e_i}^2.$$

Even though error scores are assumed to vary from individual to individual on any one administration of a measurement instrument, a basic postulate of measurement theory, as indicated by Ghiselli and Sanders (1967: 581), maintains that as the number of parallel tests increases without limit the standard deviation of an individual's error scores[1] approaches the same value for all individuals. Pursuant to this assumption is the notion that a particular measurement device measures all individuals with the same degree of reliability[2] irrespective of the individual's social-psychological structure (Ghiselli, 1963: 81). In view of the observed interactive

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[1]The standard deviation of error scores or standard error of measurement, as indicated by Kerlinger (1964: 441), is the square root of the standard variance of measurement or $\theta_{x_i}^2(1-r_{tt})$. The standard error of measurement is an individual property and its squared product is to be distinguished from the error variance (θ_e^2) for the total population which is an average of the respective standard errors of measurement for individual units (Schuessler, 1971a: 353). The standard error of measurement is only calculable if the reliability coefficient (r_{tt}) is known (Kerlinger, 1964: 441).

[2]Reliability refers to the consistency or repeatability with which parallel tests measure a particular attribute of an individual and is defined on the basis of error scores as indicated by Kerlinger (1964: 434) and is the proportion of true variance to observed variance or the proportion of error variance to observed variance subtracted from 1.00 - a perfect reliability index. Equationally, the reliability coefficient (r_{tt}) is

$$(1)\ r_{tt} = \frac{\theta_{t_i}^2}{\theta_{x_i}^2} \quad \text{or} \quad (2)\ r_{tt} = 1.00 - \frac{\theta_e^2}{\theta_{x_i}^2}$$

effects between social-psychological attributes and individual errors of measurement of a test, Ghiselli (1963: 83) indicates that it is possible to predict measurement errors on the basis of a moderator variable whereby "those individuals for whom a test has a greater degree of reliability... can be systematically differentiated from those for whom it has a lesser degree." In support of this contention Coombs (1950: 51-52), in indicating that measurement reliability is a characteristic of an individual's behavior on the items comprising a test, argues that the reliability of a test may be different for every individual who takes a test and it is, therefore, "an approximation of unknown degree to assign the same coefficient to all individuals." Consequently, Ghiselli (1963: 81-82) suggests that reliability of measurement can be improved by selecting out from the total group, sub-populations with differential errors and not only by the classic procedures of increasing test length or the elimination of items with lesser reliability.

In effect, a meaningful way of conceptualizing moderator variable effects, is that they sort heterogenous aggregations of individuals into homogenous groups (Ghiselli, 1963: 83) in indicating the degree to which the observed scores of individuals comprising a particular subgroup have some common quality or represent a psychological entity for the group

(Coombs, 1950: 52). This awareness recognizes that an individual's performance on a particular test is, as suggested by Ghiselli, (1964: 213-214), a function of numerous qualities with which the individual is endowed at birth, elaborated by the process of maturation and by his numerous social experiences together with the environmental influences operant at any particular time. This cognizance brings into focus a further basic assumption of measurement, namely, the implication that the attribute of concern is a common property, in kind or degree, of all individuals in a research population (Upshaw, 1968: 60) which is known and can be manifested by the individual respondent (Solomon, 1961: 3). This particular assumption has been problematic in empirical research and especially in studies dealing with the relationship between behavior and attitudes as indicated by Tittle and Hill (1967) and Sample and Warland (1973). In discussing this problem Converse (1970: 171-172) indicates that researchers should not expect all respondents to have a knowledge of all measurement stimuli. Even though respondents may have no real opinion about or competence in the subject matter under consideration, Kendall and Lazarsfeld (1950: 170) and Converse (1970: 175-176) suggest that if presented with the opportunity respondents feel obligated to respond to all

items[1] for reasons of social desirability or demonstration of intelligence. Under such conditions the measurement of nonexistent or weak states can only yield maximally unreliable results, particularly at the ordinal and interval levels of measurement where the respondents are assumed to possess the ability to discriminate between the presence or absence of the attribute as well as to assess its intensity or magnitude (Ofshe and Anderson, 1969: 263). As such measurement reliability, as argued by Converse (1970: 176-177) is more properly viewed as a joint property of the measurement instrument and the research population in relation to the attribute of concern rather than being viewed merely as a property of the instrument. Thus, the common view that the mere selection of "familiar" test stimuli which evoke true responses in the research sample should be modified in line with the moderator variable approach in recognizing that it may be extremely difficult to locate test items which will not be matters of nonexistent states and, thus, errors of measurement for certain segments of the population (Converse, 1970: 177).

A further source of differential errors of measurement

[1]The phenomenon of test fatigue is hypothesized by Converse (1970: 177) as being a consequence of the respondents search for faint or nonexistent opinions or knowledge in order to fulfill the requirements of the questionnaire.

arises from the fact that social measurement, of necessity, is based on the use of linguistic and nonlinguistic meanings which Cicourel (1964: 14) argues

> ...cannot be taken for granted but must be viewed as objects of study. In other words measurement presupposes a bounded network of shared meanings, i.e., a shared culture.

In recognizing that meanings of objects and stimulii arise out of and are interpreted on the basis of an individual's personal associations and experiences (Blumer, 1969: 2), it is suggested that the meanings which respondents have for measurement items may not be synonymous with those of the test designer for all segments of the research population. This consideration poses a methodological dilemma in the search for standardized measurement devices with sufficient generality to have universal applicability over a wide variety of social contexts, in that the wording may "force" a respondent to give an answer that he does not fully endorse (Blalock, 1970: 48). The moderator variable approach to measurement as used in the context of this dissertation is, however, cognizant that measurement errors may be due to diverse meanings evoked for measurement stimulii by individuals with qualitatively different social backgrounds. As such it is indicated that the moderator variable approach more closely approximates a methodological stance that respects the nature of the empirical world as recommended by Blumer (1969: 27-28).

The measurement of human attributes in general has, as suggested by Ghiselli (1966: 2), contributed to the humanizing of human beings in pointing to the very individuality of the person by showing not only that the individual is different from others, but also that he differs within himself on different traits. The moderator variable approach to measurement would appear to provide a further humanizing element to classic measurement theory whereby all segments of the population are to be differentiated with respect to their reliability and unreliability of measurement in accordance with the presence or absence of the attribute of concern and the commonality of meanings evoked by stimulii.

Moderator Variables and Causal Analysis

The most important contribution of the moderator variable technique lies in its implications for measurement theory as suggested by Ghiselli (1972: 270) and as such appears to have considerable import for meeting the measurement assumptions underlying causal analytic procedures. In addition it is suggested that moderator variables may have an important function in increasing the tenability of certain simplifying assumptions inherent in the evaluation of causal models.

The elaboration procedure formulated by Kendall and

Lazarsfeld (1950) as a means of increasing the validity of bivariate causal statements appears to have significant implications for multivariate causal inferences. In decomposing a bivariate relationship, through the introduction of a test factor or synonymously a moderator variable (Kendall and Lazarsfeld, 1950: 147-158) and (Lazarsfeld, 1958: 117-128), a number of new relationships emerge such that the original relationship is equal to the weighted sum of the partial relationships and the product of the marginal relationships between the moderator variable and each of the two original variables[1]. Four distinctive analytic relationships are possible from this decomposition procedure in accordance with (1) the temporal order of the moderator in relation to the two original variables and (2) what happens to the partial relationships. Of central concern in this discussion are the two relationships which emerge when the moderator is temporally antecedent to the other variables. In the first situation in which the partial relations disappear or approach zero a

[1]This relationship is based on the cross products for dichotomous variables but may be extended directly to the cross product terms for continuous variables which form the basis for the determination of correlation and regression coefficients. The cross product for the original statistical relationship (xy) is equated to the weighted sum of the two partial cross products $(xy \cdot t^{+})$ and $(xy \cdot t^{-})$ when the moderator is a dichotomous variable plus the product of the cross products between the moderator and each of the original variables (xt) and (yt). Symbolically this relationship is

$$(xy) = (xy \cdot t^{+}) + (xy \cdot t^{-}) + (xt) \cdot (yt).$$

spurious relationship is indicated whereby the original statistical relationship is dependent on the association between the moderator and each of the other variables.

The second result of primary concern in the dissertation is the situation where the partial relations may differ markedly or slightly from the original relationship. In this situation the focus of attention is on the relative size of the partial relations in attempting to determine if the relationship is more pronounced at one level of the moderator than at other level as a means of specifying the conditions which differentially influence the relationship (Glock, 1967: 33). The original relationship of concern is then a weighted average of the partial relations which explicates the statistical meaning of the partial correlation coefficient based on continuous data. In calculating a partial correlation coefficient as a means of controlling for the influence of certain independent variables, the result is, in effect, a weighted average of the correlation between the two variables of concern at different levels of the variable being partialled out (Snedecor and Cochran, 1967: 400). The abbreviated interpretation given to these "average" partial correlations tends to obviate what happens to the individual partials, as argued by Kendall and Lazarsfeld (1950: 162), and thus, masks any differentials in the relationship of concern which may emerge at different levels of the moderator variable being controlled.

A distinct problem in interpretation may arise in situations where the average partial equals zero but the individual partials may have opposite signs and cancel each other out in the averaging process (Kendall and Lazarsfeld, 1950: 162) and under these conditions the partial coefficient should not be interpreted as being indicative of spuriousness.

These conditional relationships in specifying the conditions under which an observed relationship is more pronounced in one subgroup than in others, should, as indicated by Selvin (1958: 610), be more properly referred to as a form of statistical interaction. The general idea of interactive effects or nonadditivity may take many different forms as indicated by Blalock (1965: 374) but as used in the context of this discussion will refer to the situations where the relation between two or more variables as measured by the slope[1] (b_{yx}) varies as a function of changes in the values of one or more other variables (Lee, 1961: 798). This conceptualization

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[1] Unstandardized regression coefficients rather than standardized path coefficients are utilized in being more appropriate for comparisons across subpopulations (Tukey, 1954: 46 and Schoenberg, 1972: 23-25). Path coefficients as functions of standard deviations tend to reflect changes in variances as much as in effects and are more appropriate for describing variable relationships in particular populations (Blalock, 1971b: 145). The unstandardized coefficients yield more valid comparisons across subgroups in ascertaining whether the underlying causal processes are similar (Blalock, 1967: 675).

would appear to be consistent with Ghiselli's (1963: 84) discussion of the contribution of moderator variables. The contribution of moderator variables to a regression or reliability equation is unique due to the low relationship between moderator and other scores. They do not, therefore, add to the equations in a multiple correlation sense (Ghiselli, 1963: 84). The interactive effects of moderator variables on the statistical relations of concern will thus be treated as heterogenous regression[1] (Velicer, 1972b: 266) whereby the regression equations most appropriate for one subgroup will not be the one most appropriate for other subgroups or for the total research population (Berdie, 1961: 664).

The consideration of nonadditive interactive causal equations appears to have both theoretical and methodological implications. From a theoretical standpoint many theories as indicated by Duggan and Dean (1969: 45) imply interaction effects, but research often fails to take them into consideration and consequently theoretically significant results remain undetected. Similarly Forbes and Tufte (1970: 371) argue that

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[1]Heterogenous regression in which within group causal processes are assumed to be relatively distinct and homogenous may be statistically evaluated through analysis of covariance (Saunders, 1956: 209) in considering the two ways in which regression equations may differ across subgroups, a difference in slopes and/or a difference in location (Velicer, 1972b: 266-267).

there may be an inadequate correspondence between our mathematical models and our theoretical knowledge of the phenomenon being studied which can only lead to invalid conclusions. To fit a single causal equation to a collection of data implies that the data has been generated by an underlying causal mechanism that is roughly the same for all segments of the population being studied (Forbes and Tufte, 1970: 375), although there may be environments or subgroups in which a particular variable is not operative or efficacious (Stinchcombe, 1968: 33). The general validity of a hypothetical causal model cannot be established by applying it to all the data at once in deriving a single parameter estimate, but rather, as indicated by Forbes and Tufte (1970: 375), by showing that the hypothesized relationships hold for various relevant subgroups within the population. These arguments are in general agreement with Blalock's (1964b: 31-32; 1967: 675; and 1971: 145-147) statements which indicate that causal statements are more appropriately stated in the hypothetical "if-then" form which focuses attention on the possibility that the same causal relationships may not be operative in all subgroups.

In accepting the notion of nonadditive interaction effects by variables excluded from the causal model of concern attention is focused on several of the assumptions underlying the statistical analyses of causal models. Namely, the

assumptions that omitted variables do not systematically influence the relationships under consideration and that the error terms of the variables are uncorrelated are brought into explicit consideration. The introduction of the moderator variable to test the genuineness and differential strength and direction of the relation between variables is a method, as suggested by Simon (1957a: 43), for determining if in fact the error terms of the variables are indeed uncorrelated, but only if it is possible to also assume that unobserved error terms of the moderator variable is also uncorrelated with other error terms. The application of the moderated regression procedure is, therefore, suggested as providing an empirical assessment of the tenability of these particular analytic assumptions.

Moderator Variables and Nonexperimental Data

Strong relationships between presumed causes and observed effects are often attacked by critics as "merely statistical" in being based on the belief, as indicated by Hirschi and Selvin (1970: 221-222), that only with experimental manipulation and control of independent variables is a satisfactory causal inference possible. However, Blalock (1964a: 26) argues that simplifying assumptions must always be made irrespective of the elaborateness of design

and that the plausibility of the simplifying assumptions is always a matter of degree whether the causal inferences are based on the "ideal" experiment or nonexperimental designs. In the "ideal" experiment the causal ordering of variables is relatively easy to establish as is some degree of control over extraneous sources of error (Simon, 1957a: 48), but the problems of internal and external validity discussed by Campbell and Stanley (1963: 16-24) may make causal inferences from the "ideal" experiment as dubious as those from nonexperimental analyses. The factor of external validity is particularly problematic with respect to determining the population to whom generalizations are to be made. Equally problematic in experimental situations is the omission of the potential influence of social structural variables in a natural social environment (Coleman, 1969: 99). Further to this Coleman (1969: 99) argues that sociologists should dispel.

> ...the myth that experimentation involves almost no perils of inference about cause and effect, while nonexperimental work always involves maximum perils.

Although expost fact controls always leave findings somewhat in doubt due to inability to consider all possible sources of spuriousness[1] (Kendall and Lazarsfeld, 1950: 139),

[1]At best it may only be possible to statistically control four to five factors and the truly relevant spurious factor may be overlooked (Kendall and Lazarsfeld, 1950: 139).

the systematic statistical comparison of differentiated subgroups does enable the researcher to partake of some of the "after-only" experimental design while avoiding the inappropriateness of experimental manipulation and randomization for many social research problems (Rosenberg, 1968: 81-82). In avoiding the arbitrary disruption of individual lives in an "ideal" experiment, Campbell and McCormack (1957: 490) suggest that the comparative method inherent in the moderator variable approach to causal analysis provides a better base for generalizations than would the "ideal" experiment. The comparative method as argued by Porter (1970: 146-147) is particularly advantageous in explaining the phenomena under consideration when some relationships are observed to be the same or to vary across subgroups characterized in different ways or under specified conditions in natural social settings. The moderator variable approach to causal analyses as a variant of the comparative method acknowledges the existence of complex interrelatedness of variables and is primarily concerned with the testing of hypotheses about the intensity of variable relationships in differentiable subpopulations. In so doing it is suggested that greater explanatory power about the relationships of concern can be achieved by referring the differences to specific variables than by obscuring the differences in computing single summarizing estimates (Blalock, 1968b: 182).

The systematic statistical manipulation and control of extraneous variables inherent in the moderator variable approach to causal analyses of observational data is viewed as being superior to simple cross sectional analyses procedures as a basis for causal analyses, in more closely approximating and adhering to the assumptions and criteria of causality such as nonspuriousness and uncorrelated error terms. In treating potential confounding influences as a control, it is possible as indicated by Blalock (1964a: 132) to reduce the effects of several confounding influences even when they are operating in completely unknown ways. It is desirable, however, to anticipate the nature and operation of the most important extraneous influences (Blalock, 1964a: 132) which necessitates a methodological and theoretical rationale for the selection of potential moderator variables. The theoretical identification of the moderators employed in the dissertation is presented in Chapter 4 in accompaniment with the causal model of concern with the methodological considerations being discussed below.

Identification of Moderator Variables

Moderator variables as indicated by Ghiselli (1963: 84) do seem to be rather specific to a particular research population and it is, therefore, not possible to state any general principles about the nature of the traits which may

act as moderators. The importance of a given moderator varies from being of prime importance for some individuals to being of little or no importance to others (Ghiselli, 1963: 65). This is to be expected as suggested by Hannan (1970: 148) as the more effects contained in the errors and disturbance terms, the less likely it is that all of them will be systematically related to the moderator variable in the same way. There would thus appear to be as many potential moderators as there are variables included in the error terms of the reliability or causal equations. In view of the pragmatic limitations on the number of variables which can be observed or introduced as moderators it is entirely possible that the variable(s) which may modify the relationships of concern or be a source of spuriousness may not be identified although there is a substantial body of empirical evidence that moderator effects do occur (Ghiselli, 1963: 84). In a sense all relationships may be considered conditional or tentative, as indicated by Rosenberg (1968: 156), in that it is always possible to stratify a relationship by a moderator and to examine the relationship in different moderator categories. In effect a moderator can be said to be present whenever the research population is segregated into subgroups who are homogenous with respect to errors of measurement (Conger, 1969: 526 and Ghiselli, 1963: 85) or with respect to the variation of the independent and dependent variables and, thus, the rela-

tionships of interest (Hannan, 1970: 81). As such, moderators as indicated by Ghiselli (1963: 85) focus "attention on the kinds of differences which exist among individuals who in some given respect are homogenous[1], thereby suggesting types of moderators".

A review of the moderator variable literature conducted by Zedeck (1971: 306) indicates that a considerable number of variables may function as moderators and the problem of readily and systematically identifying moderator variables remains unsolved. The basic question, therefore, becomes, can research samples be subdivided into substantively meaningful subgroups in order to increase the efficacy of measurement procedures and causal inferences?

Several procedures appear to be available for the identification of moderator variables for the purpose of differentiating research populations into relatively homogenous subgroups. A statistical procedure formulated by Ghiselli (1960: 3) and refined by subsequent researchers (Abrahams and Alf, 1972: 246-248 and Velicer, 1972a) is based on locating continuous

[1]Homogeneity is a relative consideration in that research samples drawn from the same population are ostensibly homogeneous on the basis of certain variables are not homogeneous on the basis of other variables which affect the relationships of concern (Berdie, 1961: 663). The subgroups formed are not sociological groups in any sense but are more appropriately referred to as quasi-groups which have no recognizable structure but whose members have certain interests or modes of behavior in common and are theoretical constructs for the purpose of explaining social phenomena (Dahrendorf, 1959: 180).

variables which are correlated with the residual terms (difference between predicted and observed scores) in a regression framework. This procedure tends to distribute individuals along a continuum whereby individuals are not separated into discrete classes and a "group" is merely those individuals who fall at the same point on the continuum (Ghiselli, 1963: 85). As a consequence, imperfect moderators (Velicer, 1972b: 269) in which class intervals may overlap are likely to result along with some chance of misclassification. In this situation errors of misclassification may become confounded with the error terms in the equations of concern which obviates the assumption that unobserved error terms on the moderator variables are uncorrelated with error terms on the causal variables (Simon, 1957a: 43).

The second approach, which is utilized in the dissertation appears to be more substantively meaningful, is based on the rational selection of variables which theory and past research indicate as being potential moderators of the measurement and causal equations under consideration. In addition to its substantive appeal, the selection of antecedent background variables used in this dissertation is more apt to result in perfect moderators (Velicer, 1972b: 269) which are ordinarily regarded as directly measured (Blalock, 1968a: 19) and less subject to errors of measurement and classification. Two potential moderators with universal appeal and applica-

tion are the location and time at which social phenomena occur in referring to the conditions upon which social phenomena are dependent (Hyman, 1955: 295-311), and as adjacent units in any spatial for temporal distribution tend to be alike on most variables relative to the heterogeneity of any larger population (Hannan, 1971: 486) they would meet the homogeneity criterion of moderators. However, as argued by Blalock (1968b: 181) greater theoretical relevance would be imparted to the analysis through the identification and utilization of substantive variables with a greater degree of general explanatory power for the phenomena under consideration.

The selection of background or demographic variables as potential moderators is of considerable substantive interest (Rosenberg, 1968: 171) and as well adheres to the purposes of the dissertation in being antecedent to the variable relationships under consideration. Although few sociologists would admit to a direct theoretic interest in demographic variables per se, Blalock (1964b: 29) suggests that background variables such as sex, education, place of residence and so forth are employed primarily as convenient indicators of other variables which may be very imprecisely defined. Each of the demographic categories will, as indicated by Blalock (1964b: 29), be suggestive of differential social environments, socialization experiences or aggregated motivations which would

be almost impossible to measure or even to identify.

The general procedure of differentiating subgroups on the basis of a single variable may result in theoretical simplicity but sacrifices theoretical and empirical accuracy as argued by Selvin (1958: 619) but as indicated by Klein et al. (1968: 151) this procedure insures that the groups are homogenous only on the variable being examined and neglects the possibility that several moderators may need to be combined[1]. These contentions are supported by Coleman (1969: 94) in arguing that it is one thing to know the separate moderator effects of particular background variables but it is quite another thing to know the joint consequences of several moderator variables summarizing differential social experiences and environments. A partial reconstruction or typology of individual attributes is suggested by Coleman (1969: 94) and Selvin (1958: 619) as one means of overcoming this problem in that sociologists are more concerned with "individuals as wholes, not...with disparate...attributes of individuals" (Coleman, 1969: 94-95). All typification as indicated by McKinney (1967: 217) consists of the pragmatic reduction and equalization of attributes to the particular problem of concern and involves neglecting those individual differences

[1]The limited use of moderators due to the difficulty in locating them may be due in part to the usual strategy of examining one potential moderator at a time (Klein et al., 1968: 151).

not relevant to the purpose at hand. Increasing the breadth and inclusiveness of the typology only tends to decrease its heuristic value in detecting the operation of particular variables (Porter, 1970: 147). As such typologies are subordinate to the aims of the research; namely, the establishment of uniformities with instrumental explanatory value. The selection and evaluation of individual moderator variables as well as a reconstructed type are used in achieving the objectives of the dissertation.

The use of background variables as moderators has been questioned from at least two standpoints. In controlling for background variables, the researcher, as indicated by Blalock (1964b: 28), may in effect be removing all of the meaningful variation which may account for the relationships under consideration. In the introduction of moderators it is desired to reduce the effects of potential confounding influences without simultaneously reducing the effects of the independent variables, and the basic problem, as suggested by Blalock (1964a: 135), is to remove the effects of moderator variables without actually controlling for the variable explicitly. The ideal case as indicated by Hannan (1971: 496) appears to be that in which the moderator variable is not related to the dependent variable or to any other causes of the dependent variable, but is related to the independent variables in such a way that the subgrouping results in an increase in the

between group variation in the independent variables. In discussing this problem Blalock (1968b: 173) indicates that controlling for background variables may have the effect of reducing the variation in the independent variable(s). This means that the magnitude of the regression coefficient may be decreased, not because the true value is affected but because the variation in the independent variable(s) has been restricted but measurement error has not. The degree to which this problem is overcome in the analysis presented is questionable but it is postulated that the moderator variable approach reduces the error variance but not the true variance in the variables of concern.

The second objection to the application of the moderator variable as a control measure arises in situations where the particular background variable(s) are part of a developmental sequence ultimately leading to the relationship between the independent and dependent variables. Basically the problem, as indicated by Blalock (1964b: 28-29), appears to require an a priori assumption or empirical method for distinguishing between the situation where the background variable is a source of spuriousness from the situation in which the background factor is a cause of the independent variable(s). This particular problem is circumvented by unstandardized regression coefficients which are relatively unaffected in controlling for antecedent variable(s) whether the variable(s) are part of a

developmental sequence or a spurious source for the relationship (Blalock, 1964b: 33). In any event Blalock (1964b: 28-29) suggests that the reasons for applying the controls may be more compelling than the risks involved in using the moderator variables incorrectly.

Methodological and Theoretical Contributions of moderator variable analyses

In the opinion of Ghiselli (1972: 270) the most important contribution of the recognition of moderator effects lies in their contributions to measurement theory. The fact that a measurement instrument may have quite different degrees of reliability for different subgroups is of great theoretical importance such as in the study of minority or disadvantaged segments of society in that, under some circumstances measurement devices tend to favor certain classes of individuals rather than others (Ghiselli, 1966: 4). Furthermore Ghiselli (1972: 270) argues that the social sciences have too long been saddled with a measurement theory which requires that a given test measure each individual with the same degree of reliability and that the test measure precisely the same traits in every individual to the same degree. The recognition of moderator variables will, as Ghiselli (1972: 270) suggests, replace the status concepts of classic measurement theory with dynamic models encompassing the qualitative description of human life. In addition to their implications for measure-

ment theory, moderator variables also appear to have policy consequences as argued by Coleman (1969: 994) in indicating that the failure to differentiate particular population subgroups has resulted in policy errors with serious social consequences. In a similar vein the recognition of an interaction between background factors of social participants and certain structural conditions may lead to a realization that the structure should be modified rather than placing an overreliance on the adjustment of the individual. Pasanella (1972: 381), for example, indicates that in certain educational situations it may be preferable to modify the classroom structure or to vary teaching practices in accordance with student types rather than insisting upon the adjustment of the students to the teaching situation.

The moderator variable technique is also viewed as being one means of introducing more complex but realistic assumptions into causal analytic procedures with respect to the omission of variables producing errors of measurement and unexplained variation (Blalock, 1969a: 4). In addition to increasing the tenability of certain assumptions accompanying causal analyses it is suggested that the refinement of measurement procedures will result in a more adequate evaluation of sociological hypotheses as well as permitting a more discriminating assessment of the relative importance of causal variables or between theoretical models of equal plausibility.

As a result of identifying and controlling for the most efficacious antecedent conditions, it may be entirely possible, as suggested by Smelser, (1968: 70), to isolate and evaluate fewer causal variables with equal explanatory power in achieving more parsimonious theoretical models. It may, thus, be possible to retain the relative simplicity of causal models recommended by Blalock (1964a: 8) but which are also sufficiently realistic that the simplifications required do not result in highly inaccurate inferences or predictions. The moderator variable approach is, therefore, viewed as one means of alleviating the basic dilemma faced in all sciences with respect to how much to oversimplify reality (Blalock, 1964a: 8).

Methodological techniques such as the moderator variable are more than ingenious ways to manipulate empirical data in that research methods are of scientific value only to the extent that they result in better theory (Denzin, 1970: 27). The value of methodological investigations is, as indicated by Selvin (1958: 607), after all, that they result in more effective theorizing about social behavior. With specific reference to moderator variable effects, Rosenberg (1972: 134) and Warren et al. (1973: 20) indicate that the recognition of population subgroups may result in more valid causal inferences and conclusions. The separate interpretation necessitated by the recognition of differentiable subgroups

enables the researcher to make more exacting and refined statements about the nature of social life with respect to: (1) focusing attention on the undifferentiated interpretation of the relationship(s) which may support, strengthen or lead to the radical revision of the original interpretation; (2) indicating background conditions facilitating or deemed necessary for the relationship(s) in establishing situational factors under which general principals obtain; and (3) may clarify the nature and meaning of the variables encompassed by the causal model as well as of the moderator variables themselves (Rosenberg, 1968: 143-157). The basic factor is, however, the deepening enrichment and strength imparted to survey data analyses as indicated by Rosenberg (1968: 157) which can be utilized in building more rigorous theory (Warren et al., 1973: 20).

General Hypothesis

The central hypothesis evaluated in achieving the objective of the dissertation is that:

antecedent background variables are identifiable which differentiate the research population into relatively homogeneous subgroups with respect to errors of measurement and with respect to the magnitude of causal parameter estimates.

The assessment of this hypothesis and resultant implica-

tions for sociological methodology is suggested as permitting a closer approximation to the criteria and assumptions of causal model analysis as a basis for more valid causal inferences in the development of and evaluation of sociological theories.

CHAPTER 4. THEORETICAL CAUSAL MODEL AND IDENTIFICATION OF MODERATOR VARIABLES

The application of the moderator variable technique as a means of overcoming several of the problems inherent in the evaluation of causal models with sociological data should not be carried out on a routine or fortuitous basis. Rather, as indicated by Rosenberg (1968: 30), the particular moderator variables utilized should be logically and theoretically identified in respect to the specific causal relationships under consideration. The present section is, therefore, concerned with selecting background variables which theory and previous research indicate as differentiating subgroups of the research population of concern (Local Civil Defense Director/ Coordinators) with respect to the errors of measurement on variables and strength of the variable relationships encompassed by a causal model of effectiveness in normative organizations.

Causal Model of Effectiveness in Organizations

The particular causal model to be utilized in assessing the validity of the moderator variable approach to measurement reliability and causal inferences was developed and

evaluated by Mulford et al. (1972a).[1] The causal model of effectiveness in organizations as developed by Mulford et al. (1972a) is based on the compliance theory of organizational behavior formulated by Etzioni (1961). Due to the nature of employment of the local civil defense director/coordinators (LCDCs) - full time paid, part time paid or volunteers - it is meaningful to consider Civil Defense as a normative organization in Etzioni's (1961: 3-15) typology of compliance relationships. A normative organization, as defined by Etzioni (1961: 5), is characterized by a power component which relies on the allocation and manipulation of symbolic rewards and deprivations. The effective application of normative power requires that the lower participants (LCDCs) be highly committed or involved with the organizational objectives. The model in placing Etzioni's hypotheses in a causal model proposes that the processes of socialization and communication can be employed to modify the initial commitment and effectiveness of lower participants in normative organizations (Mulford et al., 1972a: 63). Socialization, which occurs early in the individual's organizational career, refers to "the acquisition of the requisite orientations for satisfactory

[1]The original causal model as developed by Mulford et al. (1972a) is presented in the theoretical discussion in this chapter with the model as subsequently modified upon the deletion of statistically nonsignificant causal relationships being presented in Chapter 5 in comparison to the "moderated" causal models.

functioning in a role" and is usually carried out through formal mechanisms within rather than external to normative organizations. Normative organizations, as indicated by Mulford et al. (1972a: 63) usually stress instrumental socialization or "job orientation" over expressive socialization. "Communication" as defined by Etzioni (1961: 137) "is a symbolic process by which the orientation of lower participants to the organization is reinforced or changed". In developing their model on the basis of previous research Mulford et al. (1972a: 64-65) indicate that both socialization and communication are significantly related to role performance (organizational effectiveness) but are not causally related to each other. An associational relationship is posited between socialization and communication due to their interrelatedness whereby the amount of communication required is directly affected by the socialization processes which takes place in the organization or as preparation for participation therein (Etzioni, 1961: 138). In so doing Mulford et al. (1972b) were one of the first researchers to include both socialization and communication in the same theoretical model. A third exogenous variable[1] by which an organization

[1]Exogenous variables are independent only (Lyons, 1971: 151) and are taken as given for the model in that their values are assumed to be determined outside of the model (Blalock, 1968b: 163). An endogenous variable is dependent on any combination of other variables - exogenous or endogenous - in the model (Lyons, 1971: 151).

articulates with its environment is recruitment selectivity, and is included in the model whereby associational relationships are respectively hypothesized with socialization, communication and selectivity due to the substitutability between socialization and recruitment selectivity (Mulford et al., 1972a: 65-66).

Other ways in which the organization are hypothesized as penetrating its environment are through scope and pervasiveness. Organizations as indicated by Mulford et al. (1972a: 65) and Etzioni (1961: 160) differ in the degree to which they manifest scope or embrace their lower participants. Scope is, thus, defined as the number of activities in which they manifest scope or embrace their lower participants. Scope is, thus, defined as the number of activities in which the participants are jointly involved in collective activities and the degree to which activities of the organizational participants are limited to participants of the same organization. Scope as viewed by Etzioni (1961: 173) increases the impact of socialization upon effectiveness but does not necessarily imply that socialization leads to increased scope (Mulford et al., 1971: 23). However on the basis of previous research Mulford et al. (1972: 66) suggest that socialization will directly contribute to scope. In addition they suggest that normative organizations high on scope will be more effective and due to the substitutability between socialization and com-

munication, causal relationships between communication and scope and between communication and effectiveness are hypothesized.

In distinguishing pervasiveness from scope, Mulford et al. (1972a: 66) indicate that pervasiveness refers to the number of activities within or outside the organization for which the organization establishes norms with respect to the degree to which the norms are internalized by the individual. In noting a positive relationship between scope and pervasiveness, Mulford et al. suggest that scope is causally prior to pervasiveness. Causal relationship between both socialization and communication and the degree of pervasiveness existing in an organization are hypothesized. Further hypotheses included in the model indicate that positive causal relationships are to be expected between pervasiveness and salience and between pervasiveness and personal role tension. In indicating that recruitment selectivity is causally and positively related to both salience and personal role tension, Mulford et al. (1972a: 66) hypothesize that relatively high degrees of salience and role tension can be effected by placing an emphasis on selectivity or a combination of scope and pervasiveness.

The complete eight variable causal model of organizational effectiveness developed and empirically evaluated by Mulford et al. (1972) and evaluated in the dissertation with respect

to the effects of moderator variables is diagrammatically presented in Figure 1.

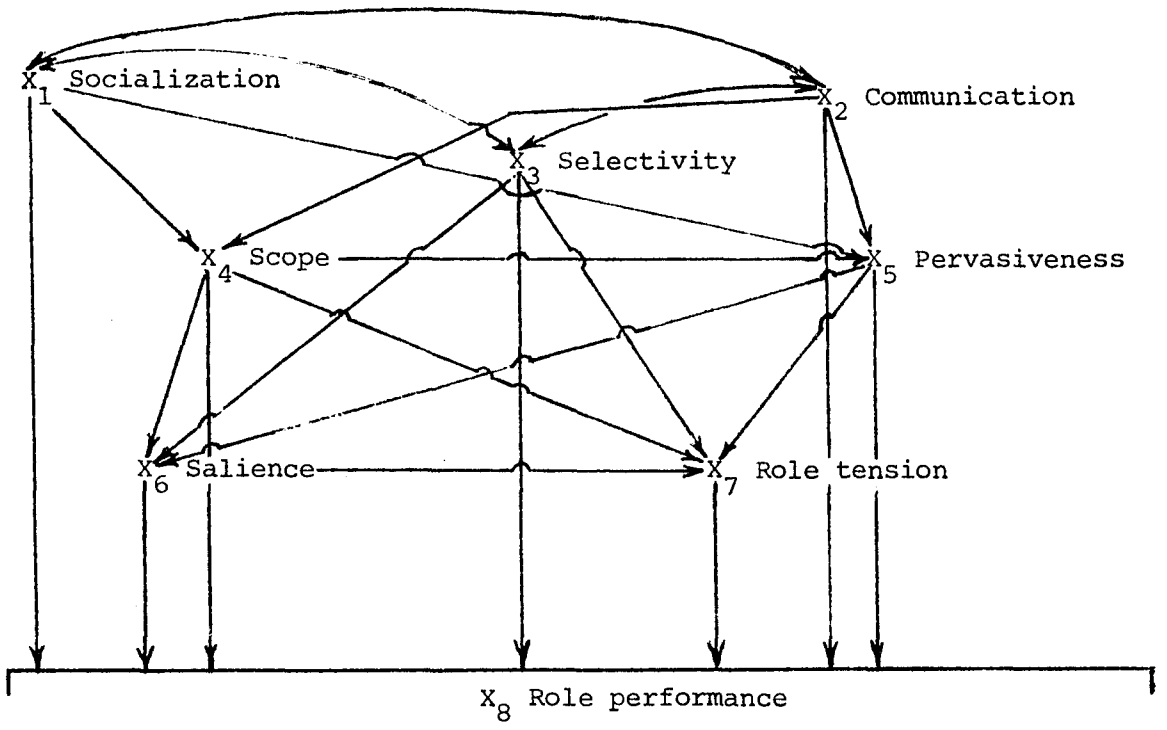

Figure 1. Theoretical causal model of variables affecting the role performance of local civil defense/ coordinators

The recursive equations for the model are:

$$X_1 = e_1 \qquad X_2 = e_2$$

$$X_3 = e_3 \qquad X_4 = b_{41.2} + b_{42.1}X_2 + e_4$$

$$X_5 = b_{51.24}X_1 + b_{52.14}X_2 + b_{54.12}X_4 + e_5$$

$$X_6 = b_{63.45}X_3 + b_{64.35}X_4 + b_{65.34}X_5 + e_6$$

$$X_7 = b_{73.456}X_3 + b_{74.356}X_4 + b_{75.346}X_5 + b_{76.345}X_6 + e_7$$

$$X_8 = b_{81.23456}X_1 + b_{82.134567}X_2 + b_{83.124567}X_3 + b_{84.123567}X_4 + b_{85.123467}X_5 + b_{86.123457}X_6 + b_{87.123456}X_7 + e_8 .$$

Of particular note in respect to the model is that role performance or the degree to which the lower participants (LCDC's) meet the role expectations of their superiors is viewed synonymously with organizational effectiveness.

Rationale for Introducing Moderator Variables into the Organizational Model

In his classificatory scheme of formal organizations Etzioni (1961: 23-67) indicates that organizations can be differentiated with respect to the mode of authority employed by superiors to control subordinates and with respect to the orientation of the subordinates to the authority component. This differentiation is based on a comparison across organizational types and in a similar vein it is meaningful to consider whether individuals with differential backgrounds and social experiences within the same organization can be differentiated with respect to their orientation to the authority component utilized in that organization as well as their responses to other organizational processes such as socialization and communication.

A common assumption underlying theoretical models of organizational behavior is, as indicated by Grosof et al. (1970: 82), that structural demands are logically prior to individual fulfillment. As such, individual performance is viewed as an unique effect of structural processes and

obviates the notion that the individuals' organizational behavior and their acceptance of the organization may be influenced by their previous experiences, their social environments, and their attitudes, habits and other personality traits (Martin and Siegel, 1953: 599). Frenkel-Brunswick (1964: 363) in discussing the two polar extremes of organizational theory - those giving primacy to the subjective experiences of the individual and those giving primacy to the social structure - argues that no exclusive factual primacy can be given to either of these aspects in a pattern so closely interwoven. The two divergent positions on individual organizational behavior are not incompatible (Nedd, 1971: 258) and as argued by Frenkel-Brunswick (1964: 364) and Argyris (1959: 146) any inquiry into the totality of the organizational process of necessity must simultaneously consider the structure of the social organization as well as the differential ways in which the organization is experienced by and incorporated within the individual. The basic problem in the effective functioning of organizations, as suggested by Katz (1967a: 548), appears to be how the participants are related to the organizational structure in stimulating reliable and innovative role behavior.

Organizational processes such as socialization, communication, authority and so forth are often considered to be individual or organizational properties and in general to be

of a unilateral nature, whereby all participants react to these processes in a similar manner irrespective of their previous experiences, abilities or motivations for subjecting themselves to the process. However, these processes are more appropriately viewed as properties of social relationships (French and Snyder, 1959: 118 and Hovland et al., 1953: 134) and it is, therefore, necessary to examine both sides of the relationship with respect to the predispositions, abilities, knowledge and so forth which the lower participants bring to the relationship in qualitatively differentiating the effects of these processes (Kelman, 1961: 61 and 1967: 438). Rather than viewing the lower participant as a passive recipient of role prescriptions (Bennis, 1959: 265) and for whom the internalization of norms is taken for granted (Homans, 1964b: 814), the introduction of background attributes as moderating the effects of organizational processes suggests that the individual is more appropriately viewed as a variable rather than an organizational given (Bennis, 1959: 265).

In view of the observed interaction between individual attributes and the organizational structure, Pervin (1968: 56) and Tannenbaum (1962: 240-241) introduced the notion of "organizational-fit" in suggesting that for each individual there are organizational environments and requisite adjustments to the organization which more or less match the

individual's personality and previous social experiences. A satisfactory adjustment on the part of the individual and resultant "organizational-fit" expresses itself in high performance, satisfaction and negligible stress in the organization whereas a lack of fit is characterized by decreased performance, dissatisfaction and stress in the organization (Pervin, 1968: 56). The immediate question of concern, therefore, becomes, can antecedent variables be identified which qualitatively differentiate the local civil defense director/coordinators with respect to: (1) their responses to the processual aspects of the civil defense organization; or (2) an interaction between individual attributes and the causal relationships in the model in being indicative of differential adjustments to the organization or correlated error terms.

Identification of Moderator Variables

Numerous theoretical formulations and previous research studies have, as indicated by Beal (1966: 249-251) and Smith (1966: 249), recognized the importance of environmental, physical and social attributes of individuals such as age, formal education, socio-economic status, place of residence and so forth in differentiating the participation and performance of individuals in formal organizations and other forms of social behavior. These "static" variables which cannot readily be changed by the organization (Beal, 1966: 251)

appear to have limited substantive appeal in comparison to more "dynamic" social psychological factors such as personality types, need dispositions, value orientations, motivations, attitudes, habits and so forth. The principal focus will, however, be concerned with identifying individual social and environmental attributes which are hypothesized as modifying the relationships of concern for several reasons, not the least of which is the pragmatic consideration as to the availability of data on "static" rather than "dynamic" attributes. Other reasons for focusing on these types of variables are:

1. As indicated previously, background factors such as sex, level of education, rural or urban residence, race and so forth are, as suggested by Blalock (1964b: 29), convenient indicators of some other variable which may be imprecisely defined. Within the context of the dissertation it is suggested that the background variables selected as potential moderators are indicative of differential competencies, orientations and social experiences acquired a priori to becoming a participant in the organization but which are hypothesized as continuing to influence the individuals participation and performance within the organization as part of a developmental sequence (Blalock, 1964b: 29), whereby the background moderator is a cause of the independent variable(s). The identification of moderator variables is, as argued by

Rosenberg (1968: 66-67), not a search for an ultimate or first cause but is an extension of truncated causal sequences in that the antecedent variable is a true effective influence. As such the background variable does not explain away the relationship between the independent and dependent variables but clarifies the influences which preceded the causal relationship (Rosenberg, 1968: 66). The logic underlying Rosenberg's statements concerning bivariate models appears to be encompassed in the definition of exogenous variables whose values are taken as given in multivariate models (Blalock, 1968b: 163). In assuming that exogenous variables are completely determined outside the causal model under consideration, other theories, as indicated by Blalock (1968b: 163) may be used to explain these variables. It is, thus, suggested that background variables are part of the theory(s) explaining the "natural" variation in the exogenous variables (Simon, 1957a: 34) in nonexperimental situations. It is, therefore, hypothesized that one of the major effects of antecedent moderator variables in the heterogenous regression model will be in producing differential variation and mean values in the exogenous variables between subgroups, and to the extent that the background variables are included in the error terms of all variables - exogenous and ednogenous - a differential effect in the variation and mean values of all variables can be expected in producing an

interactive effect on the relationships.

2. The utilization of discrete antecedent demographic variables also appears to approximate the assumptions of the moderator variable technique presented in Chapter 3 more closely than would "dynamic" continuous variables which are more subject to errors of measurement which may become compounded with the measurement errors on variables included in the model. In addition, it is suggested that the temporal ordering of background variables in relation to the other variables of concern in avoiding the partialing fallacy would be more easily established in comparison to "dynamic" variables such as motivations, attitudes and value orientations.

3. The inability of the organization to manipulate or change the background variables does not appear to be overly problematic within the context of moderator variables as used in this dissertation. From an interventionist or policy point of view, it is suggested that the prediction of the potential effectiveness of differentiable subgroups can be improved. It is further suggested that the identification of participant subgroups with divergent backgrounds will enable organizational superiors to make more meaningful and efficacious manipulations of other independent organizational variables in respect to these subgroups. The example cited previously from Pasanella (1972: 381) with respect to educational organizations, tends to indicate that rather than expecting a complete

adjustment of the individual to the organization there must be some willingness to modify structural and processual arrangements in respecting divergent competencies, and social experiences if an optimal degree of commitment to and performance to the organization is to be achieved.

The selection of potential moderator variables for the dissertative analyses is primarily concerned with identifying several background variables which are hypothesized as influencing the three exogenous variables included in the causal model of organizational effectiveness. The three exogenous variables - communication, socialization and recruitment selectivity - are highly interrelated as indicated in the discussion of the causal model. However, for heuristic purposes in identifying background variables which modify the exogenous values between subgroups, each of the exogenous variables are discussed separately. Subsequently, a further discussion of each of the moderator variables selected and development of hypothesized effects is presented.

Communication

Communication as the systematic use of symbols is often regarded as the central phenomena in organizations (Burgess, 1969: 137) and as maintained by Hall (1972: 271) and Price (1968: 163-165) communication is necessary for the effective coordination of complex organizations, such as Civil Defense,

that must deal with uncertainty and which have a technology that is not readily routinized. The more an organization is people and idea oriented the more important communication becomes (Hall, 1972: 71). Further to this Barnard (1938: 91) suggests that communication should occupy a central place in any organizational theory in that the structure, extensiveness and scope of the organization are almost entirely determined by the communication and as Simon (1957b: 108) argues

> ...failures in communication result whenever it is forgotten that the behavior of individuals is the tool with which organization achieves its purposes. The question to be asked of any administrative process is: How does it influence the decisions of these individual? Without communication, the answer must always be: it does not influence them at all.

In accepting the centralized role of communication in an organization, Guetzkow (1965: 543-546) indicates that communication fulfills at least three functions concerned with: (1) the exercise of authority in effecting administrative decisions and in gaining the commitment of lower participants; (2) the exchange of information about the internal operation of the organization and its relationship with the external environment; and (3) the task expertise and technical competence of lower participants in respect to the fulfillment of their subordinative roles. In effect, without communication there would, as indicated by Cartwright (1959: 7), be no organizational norms, no organizational goals and no organized action. However, as suggested by Simon (1957b: 108), no organizational

process is more taken for granted and poorly performed than is communication whereby plans are all too frequently "ordered" into effect without due consideration of the manner in which they can be brought to influence the behavior of the individual.

Implicit in the above statements is the commonly held deterministic expectation that a uniform interpretation, retention of and commitment to the informational and normative content will ensue from the exposure to communication when achieved (Hyman and Sheastley, 1952: 91). Underlying this expectation is the assumption, as suggested by Bauer (1967: 400), that the initiation of the communication process is exclusively with the communicator and the effects an exclusive property of the recipients in respect to the common phraseology, "who says what to whom, through what channels, with what effects?" If, however, all individuals provide equal recipiency for exposure irrespective of the channel utilized and the content of the communication, there is no reason, as argued by Hyman and Sheastley (1952: 86-87), to always observe individuals who demonstrate a relative lack of knowledge about organizational norms and goals.

The effects of communication are, as indicated by Hovland et al. (1953: 134) determined not only by the communicator(s), the content of the communication but also by the motives and

abilities of the individual recipients. In a similar vein French and Snyder (1959: 118) indicate that influence potentiality in formal organizations is partly determined by legitimate authority and partly by personal traits of supervisory position incumbents, but the greatest explanatory power with respect to the phenomena of organizational communication and influence is achieved when these processes are viewed as properties of social relationships rather than merely as attributes of particular individuals or organizational positions. In the study of authority as effected through communication it is, therefore, necessary as indicated by Sanford (1952: 329) to recognize that communication is an active process on the part of all individuals party to the relationship as it is the lower participant who on the basis of certain predispositions, previous experiences and social environmental factors who either attends or does not attend to the communication in either accepting or rejecting the content thereof.

Problems of clear communications across subsystems boundaries exist within any organization. Without adequate transmission and translation across subsystem boundaries, official directives, as suggested by Katz and Kahn (1966: 229), may not be fully effective in all parts of the organization. In situations where the lower participants do not have a

satisfying self-defining identification[1] with their organizational roles and social relationships or when the subordinates have not internalized[2] the induced behavior, norms and goals of the organization, the distance from supervisory surveillance may provide the lower participants with a greater degree of latitude in meeting their role expectations[3] than the official definition of their subordinative responsibilites would warrant (Blau and Scott, 1962: 170-171). In recognition of the disperse nature of the civil defense organization and the relatively large number of subordinates with whom certain supervisory staff are responsible, Klonglan et al. (1966: 39) indicate that a large percentage of the supervisory personnel's

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[1]Identification as a motivational basis of influence (Kelman, 1961: 63 and 1968: 440-441) refers to the situation where the lower participant derives a satisfying self-image from his organizational role and social relationships whereby his self-definition becomes "anchored" in the communicative relationship(s).

[2]Internalization (Kelman, 1961: 65 and 1968: 441) occurs when a recipient accepts influence because the behavioral changes are congruent with his value system. The content of the induced behavior tends to be intrinsically rewarding but the credibility or expertness of the supervisor in relation to the communicated content plays an important role.

Both of these influence relationships generally tend to effect both covert attitudinal compliance and overt behavioral compliance and form the foundations for positive referent orientation toward the organization.

[3]The phenomena of goal ambiguity and goal displacement may be evidenced in such situations where the communication and influence relationships do not result in an identification with and internalization of organizational goals on the part of the lower participants (Wieland, 1969: 162-163).

coordinative efforts, advice and expenditure of resources are by necessity focused on larger civil defense units. It is, therefore, necessary that the successful supervisor does more than maintain compliance[1] and discipline, as Blau and Scott (1962: 237) indicate, but the supervisor must encourage and motivate the subordinates to exert effort in assuming responsibility and exercising initiative and innovative types of behavior.

Several other factors which appear to mediate the receptivity of lower participants toward any particular communicator(s) or communication message are discussed in the literature. One of the most basic problems in communication is that the meaning(s) intended by the communicator are not the same as the meaning(s) received by the recipient(s) due to the lack of shared symbols, past experiences and backgrounds or a general lack of commonness as implicit in the generic meaning of communication (Strauss and Sayles, 1960: 200-201). This lack of commonness could be the result of several factors one of

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[1]Compliance, as defined in Kelman's (1961: 62 and 1968: 439-440) typology of motivational bases of influence occurs when the recipients do not necessarily accept or internalize the normative or goal relevant content of the communications but tend to conform to the influence relationship due to the instrumental social effects (attainment of favorable reactions and rewards or the avoidance of negative sanctions) achieved. This type of behavioral conformity presupposes the surveillance of the recipients' behavior if the induced changes are to be maintained (French and Raven, 1968: 263).

which is divergent educational backgrounds. Formal education, as indicated by Lee (1969: 55), is important in the development of basic knowledge and symbolic skills and any differential in educational experiences would tend to presuppose a divergence of meanings between the individuals in the communicative relationship. In addition, Katz and Lazarsfeld (1955: 23-24) suggest that the attitudes and psychological predispositions the recipients have toward the sender, the media utilized and the content of the communication may modify or completely distort the meaning of a particular communication.

A second potential barrier to effective communication discussed by Rogers (1972: 202) is a general lack of empathy and common frame of reference between the communicator and communicatee with respect to their divergent social roles and social environments. This lack of empathy may be particularly problematic in organizations such as civil defense in considering the wide diversity of pay statuses (voluntary personnel to full time paid) as well as a wide range of situational contexts (metropolitan centers to rural areas) with which the organizational supervisors are concerned. As in other similar situations, the supervisory personnel's perception of the subordinates' problems may differ from the subordinates' perception of the same problem (Tully, 1968: 377) as the two groups do not fully appreciate the situation of the other. This is

due to the fact as suggested by Tully (1968: 377) that the supervisory persons' perceptions and definitions of the problem are based on their past training and experiences which may differ from the experiences of the subordinates. The general lack of appreciation toward the situation of the other and the lack of a common frame of reference between parties to the communication is likely to result in a failure of communication or an unwillingness to initiate future communications.

Directly related to the latter factor cited above and to the internalization basis of social influence is the credibility of the source as perceived by the recipient to the communication. A credible source as defined by Rogers (1972: 205) is one that is viewed as being both competent and trustworthy whereby the source is perceived as providing information which is correct and in the recipients' best interests. If the recipients perceive that the source is relatively credible in providing information that can be used effectively in relation to the recipients' capabilities and jurisdictional situation, the lower participants can be expected to be relatively receptive to the communication. However, the recipients may have a general cognizance of the communicated content, normative and role expectations but if the implied behavior is incompatible with the lower participants' value system, their abilities to effectuate the initiation of the

behavior, their social and cultural environments and the availability of resources, the behavioral content will not be adopted (Rogers, 1962: 126-132 and Eichholtz and Rogers, 1972: 627-628) nor is the content likely to be retained as indicated by Hovland et al. (1953: 246-249). These latter authors indicate that more meaningful and compatible content is more readily retained as both the quantity and quality of retention is influenced by the initial comprehension and by certain predispositions and motivations which the recipients have toward the relationship.

A general factor which differentially predisposes individuals to the susceptibility of influential communication irrespective of the content is persuasibility (Janis and Field, 1959: 29-30). The presence of this factor implies, as indicated by Janis and Field (1959: 29-30), that some individuals tend to be indiscriminately influenced by persuasive communication while others tend to be generally unresponsive. In their research Janis and Field (1959: 58-59) observed that males were less persuasible than females but in a complex manner involving factors such as differential societal roles, intellectual independence and docility. Hovland et al. (1953: 277) also indicate that mental ability may be related to persuasibility but in a complex fashion wherein individuals with higher intellectual ability are able to more readily comprehend the information presented and able to more readily

draw the appropriate inferences. However, these same individuals are likely to be more critical in accepting information and influence from persons of lesser ability.

A further factor differentiating individuals with respect to their communications behavior, that has been observed in adoption-diffusion and other communication research, is that certain individuals have a greater propensity to anticipate and expose themselves to new ideas and information and are, thus, more predisposed to effect communications. Individuals, as indicated by Katz and Lazarsfeld (1955: 21) are not exposed to specific communication as much as, as easily, or as randomly as is commonly assumed. It is typically voluntary factors rather than technological, political or economic factors which account for who is in the audience for a particular communication to the extent that

> ...groups which are most hopefully regarded as the target of a communication are often least likely to be in the audience. Thus, educational programs, it has been found, are very likely to reach the uneducated... (Katz and Lazarsfeld, 1955: 22).

The adoption leaders or innovators who tend to avail themselves to a wider variety of communication sources, such as typically used in civil defense, are as indicated by Copp (1956), Gross and Taves (1952), Lionberger (1960: 96-100) and Rogers (1962: 171-185), characterized as possessant of: (1) more cosmopolitan and professional orientations; (2) higher educations or mental abilities in manipulating abstract

symbols; (3) greater flexibility in their decision making processes; (4) higher socio-economic statuses; and (5) were generally younger than later adopters. In addition Duncan and Kreitlow (1954: 357) observed that the diversity of social and cultural values characterizing heterogenous neighborhoods were more conducive to the introduction of technological and social changes with respect to educational programs than were homogenous neighborhoods.

A similar consideration to the anticipation and adoption of new ideas is the self-initiation required in the avoidance of occupational and professional obsolescence associated with the increased growth rate of knowledge and technical inventions (Brim, 1968: 202). Obsolescence, as indicated by Rothman and Perrucci (1971: 148) is not equally distributed throughout an occupational or professional group in that some individuals become obsolete more quickly or more severely than do others while others become obsolete in certain knowledge areas but not in other areas. In their study of professional engineers, Rothman and Perrucci (1971: 148-152) observed that individuals with higher levels of education and a more cosmopolitan orientation exhibited lesser degrees of obsolescence and also tended to avail themselves more to continuing educational opportunities through publications, professional meetings, informal discussions with colleagues and formal educational opportunities than did individuals with lesser

amounts of education. In observing similar trends in adult education Brim (1968: 201) indicates that

> ...the clearest distinguishing characteristic of those participating in adult education is that they are already among the best educated...and...that a given amount of education may be a threshold over which one must cross, both to awaken interest in self-growth and self-improvement leading to self-initiated adult socialization, and also to reach occupational levels where the job demands are for continuing updating of one's occupational skills.

In summary it is suggested that individuals can be differentiated with respect to the degree to which they tend to expose themselves to informational or persuasive communication. It is further suggested that exposure, once achieved, does not result in a uniform interpretation and retention of content or a uniform acceptance of influence but appears to be affected by:

1. the capabilities and competences of the recipients in relation to the implied behavior;

2. the predispositions and motivations of the subordinates toward the communicatory relationship;

3. the degree to which the organizational relationship(s) provide a positive referent matrix for the individuals, and

4. the congruence between the subordinative personnels' past experiences and situational contexts and the implied behavioral expectations.

Recruitment selectivity

A basic essential for the effective functioning of an organization is that individuals be induced to enter and remain in the organization (Katz, 1967a: 549) in recognizing as indicated by Pavalko (1971: 44) that:

> ...while many characteristics of work can and do change over time one factor that remains constant is the need to continually recruit persons to fill work roles and the need for individuals to make decisions about the kind of work they will pursue.

A major difficulty in the recruitment process, as indicated by Etzioni (1961: 153-154), is that the recruitment of personnel to fill new positions or to refill vacated positions must reflect the preferences of the organization but also the preferences of the potential recruits as well as market conditions. In effect this tends to indicate that the potential participant market may be limited which may affect the organizational activities. Under certain conditions the joint processes of recruitment selectivity and occupational choice on the part of potential participants may be the result of fortuitous circumstances or the result of rational decisions by both the organization and the potential recruits (Pavalko, 1971: 48-49). The rational decision-making and fortuitous approaches represent polar extremes of the recruitment and occupational choice processes with respect to the underlying assumptions and resultant effects on the

individual's organizational performance (Pavalko, 1971: 49).

The fortuitous explanation, as indicated by Pavalko (1971: 49), views the occupational choice and recruitment processes as being spontaneous, nonrational and as being influenced by situational factors such as market contingencies. The rational decision-making approach in contrast, views the processes as being structured and purposive in attempting to maximize the congruence between the individual and the organization. Which perspective is the more accurate description of the recruitment and occupational choice processes is an empirical question in that one explanation, as Pavalko (1971: 49-50) indicates, may be more appropriate for certain types of organizational positions and individuals than is the other.

In direct reference to the occupational choice process of the organizational recruit, Pavalko (1971: 44-62), indicates that individuals can be differentiated with respect to certain background variables and resultant organizational performance in relation to whether their choice was based on fortuitous circumstances or rational decisions. Individuals who make their occupational choices on the basis of a rational-decision making process tend to select an organizational career congruent with some important facet of their self-identities (Hall et al., 1970: 177) developed during various stages of their maturation process. As such, the choice is

viewed as being part of a long term decision making process and as indicated by Pavalko (1971: 47-48) is based on

> ...a reasoned and well thought-out choice that represents a compromise between their "preference hierarchy" (the kind of work they would ideally like to enter) and their "expectancy hierarchy" (the kind of work they can realistically expect to attain).

Individuals who enter an organizational career on the basis of rational decisions are thus viewed as maximizing their educational and occupational aspirations and tend to exhibit a stronger identification with the organizational norms and goals (Hall et al., 1970: 177) as well as a professional orientation toward their performance (Pavalko, 1971: 48). In contrast, individuals who make their choices on the basis of fortuitous circumstances may enter the organization without much prior thought or planning and is generally indicative of little or no advance preparation and is more appropriately viewed as entry into the occupational end of Pavalko's (1971: 48) occupation-profession typology.

A professional orientation in contrast to an occupational orientation is according to Pavalko (1971: 16-27) indicative of: (1) a service rather than a self-interest or desire for reward motivation; (2) a sense of calling or long term commitment to or involvement with the career and achievement of organizational objectives; (3) a sense of collegial "community" and identity with a particular role definition; (4) competence in a specialized body of knowledge; and (5) an

internalization of basic social values. A professional orientation may, therefore, be considered as one condition for a high degree of involvement with and commitment to the organizational objectives as well as a high degree of competence necessary for the achievement of these objectives.

Pavalko (1971: 16) suggests that the differences between a professional and occupational orientation is a matter of degree and not of kind but they do tend, as suggested by Ladinsky (1967: 231-232), to be indicative of differential circumstances and paths followed by the individuals in relation to their occupational and organizational careers. In effect, the concomitant processes of recruitment selectivity and occupational choice may not be random processes with respect to potential recruits and organizational positions but may be a social selection process (Sewell, 1970: 578) in that as Pavalko (1971: 93) suggests

> ...there is always selectivity of some sort operating to determine the characteristics, skills, ability, beliefs, etc., of those who present themselves as aspirants to the occupation.

Consequently it is suggested that individuals recruited or "selected" for similar subordinate positions in a diverse organization, such as civil defense which encompasses divergent pay statuses and jurisdictional locations, can be differentiated with respect to educational backgrounds, pay statuses and jurisdictional location. These factors would

appear to be generally indicative of: (1) divergent educational and occupational aspirations; (2) different orientations toward their organizational roles; (3) the range of choices available to the individual and organization in their "selection" processes; (4) differential competencies required and available at different jurisdictional locations; and (5) diverse circumstances surrounding the recruitment of lower participants.

Socialization

The main portion of an individual's socialization into society is generally completed with maturity, but as indicated by Etzioni (1961: 142) the development of new skills and role orientations is necessitated whenever an individual enters upon a new organizational career. The study of organizational socialization like that of the communication process is, as suggested by Etzioni (1961: 142), concerned with

> ...the processes by which the beliefs, norms and perspectives of the participants are brought into line with those of the organization. Unlike communication, however, it is concerned with the period before or shortly after new participants join the organization, when efforts to induce concensus between newcomers and the rest of the organization are comparatively intensive.

In effect, successful socialization, as indicated by Rosow (1965: 35) is expected to produce conformity to shared expectations about organizational values and behavior. However, value commitment and behavioral conformity as bi-

dimensional ends of the socialization process may vary independently whereby all socialization is not successful nor is conformity to expectations the infallible result in that the socialization process, as argued by Rosow (1965: 35), "does not function like a social die process which stamps out uniform social products".

The adult socialization process in comparison to earlier formative socialization is confronted by a unique and complex problem whereby socialization into the organization, in developing the requisite orientations and competencies, implies the learning of new roles and norms, the unlearning and abandonment of previous norms and roles or the extension of role and normative definitions developed a priori to entering the organization. The success of any adult socialization process on the subsequent role performance of the lower participants appears to be influenced by what the socializees bring to the process in terms of personality attributes, predispositions and socio-economic backgrounds in accounting for the divergent pathways by which the individuals come to the organization (Bucher et al., 1969: 213-214).

An important factor which may limit or facilitate the adult socialization process, as indicated by Brim (1969: 239-240), is the adequacy or absence of earlier socialization experiences. Socialization into an organizational role is generally facilitated when it is primarily a creation of a

new combination of old response elements developed in preparation for the occupancy of subsequent social roles. Although it is impossible to socialize individuals in the formative years to successfully occupy all subsequent roles in a complex occupational structure, the adult socialization process is limited, as Brim (1969: 241) suggests, by the absence of certain social skills, creativity, initiative and an intelligent response framework in meeting a variety of social demands. In general, organizational socialization is limited "when something that should have been acquired as a basis for later learning was not" (Brim, 1969: 241).

The adequacy of the socialization process is also limited to some extent by a general lack of empathetic understanding and a common frame of reference between the socializing agents and the socializees and their organizational positions. Lippitt (1968: 337) suggests that in many situations the socialization effort is primarily a projection of the socialization agent(s) own needs, experiences and definitions into the socialization process whereby the process may not be equally appropriate or relevant for all socializees in considering their divergent backgrounds, abilities and jurisdictional contexts.

A facilitative factor in the efficacy of the socialization process, as discussed by Merton (1968: 319-322), is the existence of a positive orientation toward and identification with

the organization prior to being recruited or "selected" into the organizational role. This positive orientation toward nonmemberships groups or anticipatory socialization refers to the situation whereby the individuals aspire to and project themselves into the organizational role in adopting the values, norms and role commitments of the organization prior to their recruitment or "selection" into the organization (Merton, 1968: 319). This phenomenon has several implications for the initial socialization of the individuals into the organization as well as for their subsequent adjustment into and identification with the organization as indicated by Merton (1968: 319-320) and Pavalko (1971: 86) and as such would appear to mediate the effectiveness of the formal socialization process. However, the extent to which anticipatory socialization facilitates or hinders the entry and adjustment of the individuals into the organization appears, as indicated by Pavalko (1971: 86), to be dependent on the degree of congruence between the anticipated and actual norms and goals as mediated by: (1) the individual's familiarity with or exposure to the specific or similar roles; (2) the length of time the individuals have anticipated entering a similar class of roles; and (3) the amount and type of education or training received prior to or during their recruitment to the organization. Pavalko (1971: 86), suggests that the phenomenon of anticipatory socialization is more applicable to lower participants possessant of a pro-

fessional orientation who are recruited or "selected" on the basis of a rational decision-making process in being cognizant of the socializees' differential aspirations, educational backgrounds and collegial reference groups. This implication would appear to be consistent with Etzioni's (1961: 158) hypothesis with respect to the relationship between socialization and selectivity in that

> ...all other things being equal, socialization and selectivity can frequently substitute for each other, on the simple ground that if the organization can recruit participants who have the characteristics it requires, it does not have to develop these characteristics through training or education. On the other hand, if the organization has to accept every member who wishes to join, or every member of a specific but larger and unselected group, it has to turn to socialization to produce the desired results.

A further factor differentiating individuals with respect to the effectiveness of the socialization process, as discussed by Katz (1967b: 187), Pavalko (1971: 94) and Sewell (1970: 69-570), is the degree to which the socializees identify with and maintain relationships within the organization in comparison to their identities with primary or other reference groups external to the organization or a cosmopolite orientation in comparison to a localite orientation. Merton (1968: 441-475) introduced the terms localite and cosmopolite as a result of a community study in order to characterize divergent orientations of local influentials. The localites tended to have a parochial orientation in limiting their concerns to the local community whereas the

cosmopolites tended to be ecumenical in being oriented toward the larger society. Subsequent researchers such as Bennis et al., (1958: 481-500), A. Gouldner (1958: 281-306 and 444-480) and H. Gouldner (1960: 468-490) have applied the localite-cosmopolite typology to the study of organizational commitment and identification on the part of lower participants. The results of the studies carried out by the above named researchers are somewhat different in relation to the particular definitions employed in describing the two types of orientations. However, Bennis et al. (1958: 496) and H. Gouldner (1960: 485) observed in their studies of a hospital outpatient department and the League of Women Voters respectively that individuals with a cosmopolitan orientation tended to identify with and be committed to varying levels of the organizational structure(s) whereas individuals with a localite orientation tended to refer more to external groups, exhibited lesser degrees of organizational identification, and commitment and were less interested in developing professional skills. Several background and behavioral characteristics have been suggested in the literature in differentiating the cosmopolites and the localites. Merton (1968:451) and Bennis et al. (1958: 494) observed that individuals with a cosmopolitan orientation were generally younger and better educated in comparison to the localites. Merton (1968: 460) and Rogers (1962: 102) also indicate that the cosmopolites tend to avail them-

selves to a wider range of information sources as well as being more innovative in the acceptance of new ideas and information in comparison to individuals possessant of a localite orientation. A stronger identification with and commitment to the particular organization does not necessarily imply that the activities of the cosmopolite participants are limited to the organization to the exclusion of other groups but their outside affiliations may be of a more qualitative nature (Merton, 1968: 451) and more professionally oriented (Bennis et al., 1958: 496) in comparison to the localites who emphasize quantitative associations of a less professional nature.

In summary it is suggested that the effectiveness of the organizational socialization process in developing the requisite skills, knowledge, identification with and commitment to the organization is influenced by certain attributes of the socializees and their social environment. In particular it is suggested that the efficacy of the socialization process is mediated by: (1) divergent educational backgrounds in being indicative of differential social and task-oriented skills, aspirations and orientations as preparation for the socialization activities and subsequent role performance; (2) the relevance of the socialization material to the individuals' jurisdictional locations; and (3) the general predispositions and expectations that the socializees bring

to the organization.

The Moderators and Hypothesized Effects

On the basis of the previous discussion it would appear three separate attributes of the lower participants or their jurisdictional location as well as one general type encompassing the three individual attributes are identifiable with respect to differentiating the effectiveness of the communication, selectivity and socialization processes in the causal model of organizational effectiveness. The variables selected and hypothesized as moderating the reliability of measurement and the strength of the causal relationships of concern are: level of formal education, pay status, rural-urban location and cosmopolitan-professional or locality-occupational orientation. It is, recognized that other moderator variables could be identified, but due to the exploratory nature of the dissertation and the pragmatic considerations of data availability[1], the focus of the analysis is restricted to these four variables.

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[1]In recognition of the limitations posed by the non-collection of moderator variable data, Glock (1967: 22) suggests that in the ideal moderator variable research design, data on the independent, dependent as well as for such variables that theory indicates may affect the relationship(s) of concern should be collected.

Education

The importance of education to the effective functioning and participation of individuals in an organizational setting is congruent with the American value system which gives prominence to both equality and achievement (Williams, 1964: 12), whereby all citizens, as indicated by Smith (1968: 274), may become prepared for effective participation in modern society. Implicit within the goals of education is the development of essential skills and knowledge, but also to more fully develop the individual's potentials, abilities and capacities for the individual's own benefit as well as for the benefit of the larger society. However, the most important contributions of education to an organizational society, as suggested by Trow (1967: 360-361), appear to be: (1) the development of rationally oriented behavior directed toward the shared achievement of and shared commitment toward organizational goals and normative expectations; and (2) the development of increased decision making skills in eliciting innovative and effective responses to new situations and ideas rather than over-reliance on prescriptions for action. The degree to which the educational process is successful in developing a causally important self-identity and general sense of competence vis-a-vis society (Smith, 1968: 281) is suggested by Katz (1967a: 563) as differentiating individuals with respect to their

abilities and predispositions to identify with and internalize the goals of an organizations purpose and not because of the security available in the organization.

On the basis of the above and previous discussions it is apparent that participants' educational background plays an important role in the effective functioning of an organization. It is therefore, suggested that lower participants (LCDCs) with divergent educational backgrounds can be differentiated with respect to their performance in the civil defense organization. The following hypotheses are, thus, posited in relation to the differential effects of formal educational backgrounds on the variables and causal relationships of concern.

Hypothesis 1: Formal educational background will function as a moderator variable in relation to the causal model of organizational effectiveness with respect to the relative efficacy of variables.

In addition to the above stated hypothesis, one of the central concerns in the disseration is the moderating effects of background variables on errors of measurement. In recognizing that divergent levels of education are differentially related to symbolic skills, general meanings and knowledge of communicatory stimulii, it is further hypothesized that:

Hypothesis 2: Formal educational background will function as a moderator variable with respect to reliability of measurement on composite measures utilized in the causal model of organizational effectiveness.

Rural-urban jurisdictional location

Rural-urban differences have and continue to be an important focal point of sociological theory and research at the community and individual level of analyses. The distinction between rural and urban according to Schnore (1966: 132) is a familiar one as evidenced by its usage in everyday language but the criteria employed in the distinction are "hardly exact and certainly not scientifically precise". Dewey (1966: 184-187) in examining eighteen different sources concerned with rural-urban differences noted a wide variety of criteria for distinguishing ruralism from urbanism as well as a general lack of consensus as to what the two terms specify. The basis of the distinction, as suggested by Schnore (1966: 132), is usually conceived as occupational in that rural communities are essentially devoted to primary activities with a relatively homogenous, socially undifferentiated sparse population whereas urban communities are considered to be densely populated centers of secondary and tertiary activities with a relatively heterogenous and socially differentiated population. While rural-urban differences in North America appear to be diminishing, the disappearance of sub-

stantial differences between rural and urban areas and between rural and urban people is, as Schnore (1966: 131) suggests, often over exaggerated.

The basic concepts of rural and urban in pointing to differences between communities and individuals that are too important to be ignored and as, indicated by Schnore (1966: 135-136), have considerable heuristic value. Dewey (1966: 192) in arguing for the retention of the rural-urban continuum as a focus of sociological inquiry indicates that

> ...the influence of rural and urban environments upon social organization and individual behavior will remain important factors, to be considered with more important cultural facts, forms and content which are the sociologist's stock in trade.

In suggesting that place of residence is a fundamental social characteristic of the individual, Schnore (1966: 136) indicates that a wide range of individual behavior and orientation can be referred to either the individuals' present residence or to the type of community in which they were born and raised. With direct reference to the lower participants' performance as influenced by their community of residence, Katz and Kahn (1966: 26-27) indicate that an organization is most realistically viewed as an open system in being continually dependent upon its environment. As such, Katz and Kahn (1966: 26-27) indicate that environmental influences are integrally related to the functioning of a social system whereby, as Hall (1972: 297) suggests, conditions external to

the organization contribute to what goes on within the organization, and the consequences of its action.

It is, therefore, more appropriate to apply a two-step model to organizational analyses, as indicated by Campbell and Alexander (1970: 316), in moving from the characteristics of the total system to the situation which is perceptually important and salient to the individual. Demographic, ecological and cultural conditions under which the lower participants function may, as Hall (1972: 303-305) states, be important situational determinants of the local civil defense personnels performance. Demographic factors such as the number of people served, their age and sex distributions make a great deal of difference to organizations (Hall, 1972: 303). In addition the numbers of organizations with which a local civil defense unit has contacts and relationships within its ecological environment is an important influence on the lower participants performance and as indicated by Hall (1972: 304) these contacts are likely to be greater in an urban than in a rural center.

The values and normative expectations of the indigenous population in a local organization's cultural surroundings has a major impact on the performance of that organization (Hall, 1972: 306) and on the participants' behavior with respect to the adoption of new ideas and practices. In observing that innovativeness (the degree to which an individ-

ual adopts new ideas) varies between neighborhoods, communities, regions and so forth, Flinn (1970: 983) attributes this variation to the presence of social norms and values in relation to "what ought to be" with respect to the relative worth attributed to various aspects of human behavior. The desirability of innovative behavior is particularly important under conditions of low supervisory contacts as indicated previously but appears to be mediated by the relative heterogenity of the community (Duncan and Kreitlow, 1954: 357) where the variety of social values creates a conducive climate for the introduction of new behavioral patterns as well as by the level of formal educational attainment (Trow, 1967: 367). The relative influence of cultural values and norms on the lower participants performance is also dependent on the degree to which the individuals' refer to primary rather than secondary groups. Wirth (1966: 50-51) indicates that urbanism as a way of life tends to foster cosmopolitan secondary relationships and it is suggested that these relationships which reward differences rather than like-mindedness are not as antithetical (Litwak and Meyer, 1966: 35) to the organization as are primary group relationships. In recognizing that the lower participants may hold conflicting norms, or occupy conflicting roles, Katz (1967b: 187) indicates that the effectiveness of the socialization process may be mediated by the degree of attachment to predominant values, norms and

roles in primary reference groups. Culture as indicated by Hall (1972: 306) is not a constant influence, however, as values and norms shift in response to the occurrence of events, such as the Cuban Crisis (for example) affecting the populations involved and their relationship to the civil defense organization.

The relative importance of environmental influences is not clear as indicated by Hall (1972: 305) but they are generally recognized as operative in terms of a complex interactional pattern. On the basis of the above and previous discussion it appears that the environmental conditions under which the local civil defense personnel function may differentiate the lower participants with respect to their organizational performance and commitments in being suggestive of the following hypothesis:

Hypothesis 3: Jurisdictional location (rural-urban) will function as a moderator variable with respect to the causal model of organizational effectiveness in relation to the relative importance of variables and the relative strength of causal relationships.

In indicating that jurisdictional location mediates the amount of supervisory communication effected, it is suggested that rural and urban directors can be differentiated with respect to their knowledge of and attitudes toward organizational goals and norms, the following hypothesis is formulated:

Hypothesis 4: Divergent civil defense positions (rural-urban) will function as a moderator variable in relation to errors of measurement on composite measure used in the causal model of organizational effectiveness.

Time and salary status

A variety of lower participants function within the civil defense organization with respect to the time devoted to their organizational position as well as the salary received for their efforts. For example, in the three states studies, local directors may occupy their positions on a full-time or a part-time basis. In addition the local persons may be paid or volunteer civil defense directors (Klonglan et al., 1966: 103). The decision as to the type of director recruited in any particular civil defense area is a prerogative of local governing bodies and the type of director selected is suggested as being dependent on the size of community, availability of resources and the general attitudes toward and salience of civil defense in the local jurisdiction. These considerations may be indicative of propitious circumstances facilitating or inhibiting the individuals performance (Rosenberg, 1972: 143) in relation to environmental relationships and the social norms existent in the community.

An important organizational facility, as indicated by Klonglan et al. (1966: 104), is the salary received by the local civil defense personnel for their endeavors. Voluntary

directors who receive little or no reimbursement for their efforts are required to carry out their role commitments on their own time. Klonglan et al. (1966: 104) also indicate that the lower participants' satisfaction with their organizational positions may be a positive function of the salary received. Pay status, especially for full-time paid directors, would also appear to be related to the process by which the individuals are recruited or "selected" for their organizational positions. In being somewhat indicative of the range of choices available to the individuals and the amount of preparation involved before entering the organization, it is suggested that the recruitment would tend to be based on a rational decision-making process rather than fortuitous circumstances. The background preparation involved whereby the individual anticipates occupying an occupational role is also suggestive as mediating the socialization process in orienting the individuals to organizational roles and expectations. The pay status consideration also appears to be encompassed by Etzioni's (1961: 10) distinction between calculative and moral involvement or commitments in relation to whether compliance is based on remunerative or symbolic rewards respectively.

The time devoted to the organization by the lower participants also appears to have important ramifications for their subsequent performance and effectiveness of the organizational

processes. In any given situation, Hovland et al. (1953: 155) suggest that, conformity to influential communication is dependent on the extent to which communicatory stimulii associated with the organization are able to successfully compete with other stimulii in the individuals environment. In effect communication effectiveness, as indicated by Katz and Lazarsfeld (1955: 71), is dependent on media monopolization or the degree to which the individuals expose themselves to the media, and their acceptance of the media relative to other sources as a function of the diverse pressures acting upon the individual at any given time. These considerations as indicated by Hovland et al. (1953: 155) and Katz and Lazarsfeld (1955: 71) are mediated by the degree of ego-involvement with the communication, the degree to which the organizational communications can capture the individuals attention and the degree to which the organization under conditions of high salience is likely to result in more immediate conformity (Hovland et al., 1953: 161). As indicated by Kelman (1967: 441) the effectiveness of communication is influenced by the degree to which the individuals self-image as derived from their organizational role is anchored in the organization. It is, therefore, indicated that full-time directors irrespective of their pay status are more able to devote more attention to their organizational role in comparison to part-time directors whose attention and energies may be divided between

several roles. It is also suggested that full-time directors are likely to derive a more satisfying self-definition from their civil defense roles in relation to part-time directors whose self-definitions may be derived from several diverse organizational roles.

On the basis of the above discussions it appears that a complex process is involved in differentiating local civil defense directors on the basis of time and salary status in that the effects of time devoted to the organizational role may be offset by the pay status and vice versa. There does, however, appear to be sufficient justification for developing the following hypotheses in relation to the diverse orientations, motivations, aspirations and organizational anchorages which are likely to be exhibited by individuals with divergent time and salary statuses.

Hypothesis 5: Pay and time status will operate as a moderator variable in relation to the causal model of organizational effectiveness with respect to differential causal parameter estimates and differential efficacies of causal variables.

Hypothesis 6: Divergent time and pay status will differentiate the research population into subgroups in relation to the measurement reliability on composite measures employed in the variable relationships of concern.

Cosmopolitan-localite orientation

In recognizing that the three separate moderators - formal education, jurisdictional location and time-salary status are highly interrelated with respect to their individual effects on the relationships under consideration, it appears to be meaningful to develop a typology to evaluate the simultaneous effects of the three variables in combination. In so doing it is suggested that time-salary status to some extent is indicative of differential educational levels and jurisdictional locations but also that the reverse may be true whereby one moderator (educational level for example) may offset the influences of one or both of the other variables. The development of a multi-dimensional profile or moderator is consistent with Coleman's (1969: 94-95) recommendation that sociologists are concerned with individuals as wholes and not disparate attributes of individuals. In addition, the simultaneous use of several moderators, may as indicated by Klein et al. (1968: 151-152) overcome the limitation of evaluating one variable at a time in which case the subgroups formed can only be considered relatively homogenous on the particular variable being examined.

In referring to the multi-dimensional typology as the cosmopolite-localite orientation it is acknowledged that the three dimensions being included - education, jurisdictional location and time-pay status - do not necessarily represent

the conceptual dimensions as utilized by previous researchers. It is, however, suggested that the differential orientations to the organization implied within these three dimensions are in general indicative of differential orientations as encompassed in other usages of the concepts. For example, the more professional orientation of more highly educated paid personnel in urban centers tends to imply a higher degree of commitment to all levels of the organization and thus a cosmopolitan orientation in comparison to the less professionally oriented, voluntary personnel in rural jurisdictions who tend to be more locality oriented as used by H. Gouldner (1960) and Bennis et al. (1958).

In encompassing the hypothesized moderator effects of the three basic dimensions it is suggested that the moderating effects of the cosmopolite-localite typology will be consistent with those of the three component dimensions under congruent conditions; that is, high education, high pay-time status and an urban jurisdiction or the reverse of these, but the effects of the mixed types will not necessarily be in the expected direction due to the complex interaction between the three dimensions in off-setting or enhancing the moderator effects of each other. However on the basis of the previous hypotheses with respect to the three typological components, the following hypotheses are formulated:

Hypothesis 7: The cosmopolite-localite typology as constructed will function as a moderator variable in differentiating population subgroups in relation to the efficacy of causal variables and the magnitude of causal parameter estimates.

Hypothesis 8: Differentiable errors of measurement will be exhibited between subgroups formed on the basis of the cosmopolite-localite typology.

In summary it is suggested that the moderating effects of distinguishable population subgroups recognizes that errors of measurement vary from individual to individual in relation to certain social psychological attributes but more importantly from a theoretical standpoint that individuals can be differentiated as hypothesized with respect to their abilities, predispositions and motivations in effecting organizational and other social processes. The primary concern has, therefore, been devoted to identifying antecedent variables which theory and previous research indicate may differentiate subgroups with respect to the relative efficacy of causal variables and at the same time with respect to errors of measurement. Due to the exploratory nature of the dissertation in assessing the validity and reliability of the moderator variable technique to theory testing and theory building, it is assumed that the same antecedent variable(s) will act as moderators in relation to measurement reliability and the strength of causal relationships. It is, however, recognized in respecting the specific nature of moderators that different

background variables may be differentially related to errors of measurement and other variables differentially related to the variable relationships of concern.

CHAPTER 5. METHODOLOGY

In the majority of communities throughout the United States, the local civil defense director/coordinators (L.C.D.C.'s) are responsible for implementing and accomplishing the objectives of the federal and state civil defense agencies which are responsible for the protection and shelter of the civilian population in the event of disaster (man-made, natural or nuclear) situation. The data and causal model of concern in the dissertation are the result of a study[1] conducted in the states of Georgia, Massachusetts, and Minnesota by Department of Sociology and Anthropology researchers at Iowa State University in assessing the effectiveness of the local civil defense personnel in preparing for, functioning during and recovering from an emergency situation. The unit of analysis throughout the analysis section is the local civil defense director and the subgrouping procedure utilized does not constitute an aggregation or disaggregation of data across different units of analyses. The present section is, concerned with a discussion of the substantive and moderator variables as operationalized, causal model analytic procedures, assessment of reliability of measurement and other methodological techniques utilized in achieving the objectives

[1] A complete description of the study is available from the original data source, see Klonglan et al., 1966.

of the dissertation.

Operational Definitions of Substantive Concepts

Socialization

Socialization is the organizational process by which the lower participants (L.C.D.C.'s) acquire the requisite orientations for satisfactory performance in a role and generally occurs shortly after new participants join the organization. As such socialization or job orientation in normative organizations is concerned with the mechanisms by which the individuals become familiar with the organization's role definitions, normative expectations, organizational goals and patterns of authority.

The empirical measure of socialization consisted of four items, as presented in Appendix A, designed to assess the local directors' perceptions of the adequacy of the job orientation received upon entering the organization from local governmental officials, other local civil defense personnel and state supervisory staff and the L.C.D.C.'s knowledge and understanding of their role responsibilities and commitments. The potential range of scores for each respondent varied from 0 to 36 as determined by summing the scores assigned for each individual item.

Communication

Communication is the organizational process by which information, decisions and directives are transmitted throughout the organization in order to modify or enhance the lower participants' orientation to the organization, their knowledge of and commitment to the organizational goals and to develop the local directors' role potential capabilities.

The communication score for each individual was obtained by a weighting procedure which considered the typical methods of communication between state civil defense personnel and the local directors and the frequency with which each method was used. The specific questions and the scoring procedure utilized are discussed in Appendix B and as indicated the potential communication score for each respondent ranged from 0 to 145.

Recruitment selectivity

Recruitment selectivity refers to the organizational process by which new participants are selected to the organization in the filling of new positions or previous positions vacated by the turnover of personnel. This concept is operationalized as presented in Appendix C on the basis of questions concerned with obtaining the local civil defense directors' perception of (1) the number of other individuals considered for their positions; and (2) the degree of selectivity exercised in choosing them for the particular positions.

The theoretical distribution of scores for the measure of selectivity varies from 0 to 7.

Scope

Scope refers to the degree to which the organization "embraces" its lower participants with respect to the number of activities in which participants are jointly involved and the extent to which these activities are limited to other organizational positions. Scope as a "boundary maintenance" like activity was operationalized on the basis of a composite measure consisting of five items as discussed in Appendix D. Specifically the five items are concerned with assessing: (1) the number of other local directors with whom the local civil defense person has worked; (2) personal participation at civil defense meetings; (3) the perceived desirability of a state civil defense organization; (4) the extent to which the local coordinator communicates with other people about civil defense; and (5) the local personnel's perceptions about the desirability of having symbols which easily identify them as local civil defense directors. The theoretical range of scores is from 0 to 23.

Pervasiveness

Pervasiveness refers to the number of activities in or outside the civil defense organization which are influenced

by the normative expectations of the organization. Pervasiveness is believed to be most efficacious when no organizational elites or superiors are present. A ten item composite scale as presented in Appendix E is utilized in ascertaining the degree to which organizational norms influence the lower participants' behavior in situations external to the organization in ascertaining the degree to which the local coordinators had made emergency provisions in their homes. The potential pervasiveness score for each respondent ranges from 0 to 10 as determined by summing the number of emergency items provided for in their personal residences.

Salience

The relative emotional significance or salience attached to an individual's organizational participation is operationalized on the basis of a 16 item Likert type composite scale scored by the certainty method (Warren et al., 1969), and is concerned with assessing the local participant's attitudes toward the role of "civil defense in the world today." The specific items and scoring procedures utilized are presented in Appendix F and as indicated the potential score for each individual range from 0 to 256.

Role tension

Role tension, in referring to the perceived tension one associates with participation in an organization, tends to be highest when an individual's role performance is a function of internal motivations and stimuli rather than anticipated rewards or reprimands. Too much role tension, on the other hand, may result in less effective role performance. One Likert-like item scored by the certainty method (Warren et al., 1969), as presented in Appendix G, is utilized in operationalizing this concept. Theoretically, the scores obtainable by each respondent range from 0 to 16.

Role performance-organizational effectiveness

Role performance or organizational effectiveness refers to the actual behavior, as perceived by the local civil defense directors, relative to their prescribed role requirements. Seven items encompassing the task areas specified by the organizational superiors are utilized in developing role performance scores for each individual with respect to their effectiveness in achieving the seven assigned tasks. The items and scoring procedures employed in developing role performance scores for each respondent appear in Appendix H. A score of from 0 to 2800 is theoretically possible for each local civil defense respondent.

Operational Definitions and Construction of Moderator Subgroups

The stratification of the research population into moderator subgroups presents a methodological dilemma with respect to attaining relatively homogenous subgroups and which at the same time are theoretically and socially meaningful. Subgrouping on the basis of medians or quartiles and so forth provides considerable statistical convenience but as argued by Carter (1971: 15) such subdivisions tend to obscure the theoretical insights and socially relevant factors implicit within the distribution of the variables being utilized as potential moderators. At the same time it is recognized that moderated regression, as indicated by Velicer (1972b: 269), is a large sample method if stable parametric estimates are to be achieved. The development of the moderator subgroups in keeping within the exploratory nature of the dissertation is, therefore, based on a dichotomization of the single moderator variables as well as for the typology in attempting to attain a balance between the considerations cited above. The major emphasis is, however, devoted to theoretical, logical and previous research usage considerations as the basis for forming the subgroups within the limitations posed by the size of the total research sample (N = 240). It is, thus, recognized that the homogeneity of several of the subgroups is restricted in attempting to retain relatively

sizable subgroups for statistical purposes.

Formal education

The amount of formal education local directors had received was determined by requesting the respondents to indicate the number of years of formal education they had completed at the time of the study. The absolute, relative and cumulative frequencies of the formal educational scores are presented in Table 1.

In indicating that every increment in education may not have any social consequences, much less constant consequences, Carter (1971: 21-23) suggests that efficacious increments of education occur at four major educational plateaus indicative of differential social utilities and ceremonial significance. These points represent the completion of grade school, high school, an undergraduate degree and an advanced degree and are associated with 8, 12, 16 or more years of education respectively. The formal education distribution is dichotomized at one of these educational peaks; namely, the twelfth year plateau. The two educational subgroups are: (1) individuals who have completed 12 years or less of formal education; and (2) individuals with more than 12 years of completed education. The subgroup sample sizes are 123 and 117 respectively.

Table 1. Years of formal education[a] completed by local civil defense directors

Years of Education Completed	Absolute Frequency	Relative Frequency	Cumulative Frequency
8	23	9.6	9.6
9	7	2.9	12.5
10	12	5.0	17.5
11	12	5.0	22.5
12	60	28.7	51.2
13	15	6.3	57.5
14	33	13.7	71.2
15	16	6.7	77.9
16	31	12.9	90.8
17	9	3.7	94.6
18	7	2.9	97.5
19	3	1.2	98.7
20	3	1.2	100.0
Total	240	100.0	100.0

[a]Years of formal education completed as specified by local civil defense director.

Rural-urban jurisdictional location

The population of the local directors' civil defense areas may, as suggested by Klonglan et al. (1966: 99), affect the director's role performance. A larger population may indicate the greater availability of resources in enabling the local personnel to more effectively complete their role expectations. The problems and role expectations of directors in larger centers may be quite different from the problems and expectations faced by personnel in smaller jurisdictions. In addition, Klonglan et al. (1966: 39) indicate that, due to the disperse nature of the civil defense organization and large number of local civil defense units in certain states, most of the supervisory personnels' coordination, advice and expenditure of resources tend to be focused on larger civil defense jurisdictions.

Although population size is not a completely adequate criterion for differentiating urban from rural environments, the use of other criteria such as density ratios are equally arbitrary (Schnore, 1966: 135). Size of population is, therefore, used as an approximation to the differentials implied by the rural-urban concepts. The United States Bureau of the Census definition which has been utilized in previous research is used in the dissertation whereby rural jurisdictions are those with 2500 or less people and urban areas are those with more than 2500 inhabitants. Two jurisdictional

subgroups are formed as follows: (1) rural jurisdictions with 2500 or less people; and (2) urban areas with more than 2500 inhabitants. The respective subgroup sizes are 88 and 152 as determined from Table 2.

Table 2. Population[a] of local directors' civil defense area

Population	Absolute Frequency	Relative Frequency	Cumulative Frequency
0-500	32	13.3	13.3
501-1,500	37	15.4	28.7
1,501-2,500	19	7.9	36.6
2,501-4,000	18	7.5	44.1
4,001-6,500	20	8.3	52.4
6,501-10,000	31	12.9	65.3
10,001-25,000	43	17.9	83.2
25,001-50,000	26	10.3	94.0
50,001-100,000	7	2.9	96.9
100,001-850,000	7	2.9	99.8
Total	240	99.8	99.8

[a]Actual population of jurisdiction as indicated by local civil defense director.

Time and salary status

The local governing bodies of civil defense jurisdictions have the prerogative of determining the type of director to have in their area. As a result a variety of civil defense directors are represented in the United States and, therefore, in the sample with respect to the time (full or part-time) spent on the job and the salary (paid or voluntary) received. The absolute, relative and cumulative distributions of time and salary statuses of local civil defense personnel as specified by the local directors are presented in Table 3. Two subgroups are arbitrarily established in attempting to form meaningful but relatively sizable grouping. The two groups are: (1) full-time volunteers and full-time paid directors; and (2) part-time volunteers, less than half-time paid and half-time paid but less than full-time directors with respective subgroup sizes of 71 and 129. The rationale for this subdivision is based on the assumption that full-time personnel irrespective of their pay status are able to devote more attention and energies in carrying out their role commitments in comparison to part-time directors. In addition, it is suggested that similar expectations may be held of the full-time personnel (paid or volunteer) by the civilian population, local governing bodies and state civil defense staff members in comparison to part-time directors who are recognized as being able to devote only part of their time

Table 3. Time and salary status of local civil defense directors

Type of Director	Absolute Frequency	Relative Frequency	Cumulative Frequency
Part-time volunteer	119	49.6	49.6
Less than half-time paid	39	16.2	65.8
Half-time paid, but less than full-time	11	4.6	70.4
Full-time volunteer	41	17.1	87.5
Full-time paid	30	12.5	100.0
Total	240	100.0	100.0

and energies to their civil defense roles.

Localite-cosmopolite orientation

Two subgroups are formed in order to encompass the differentials implied by the typology in reconstructing the individual from the three separate attributes--formal education, time-pay status and jurisdictional location--which are suggested as being somewhat indicative of the dimensions implied by the localite-cosmopolite concepts. A localite orientation is suggested as being exhibited by local directors who are part-time personnel, are located in rural jurisdictions and have completed 12 or less years of formal education. A cosmopolite orientation, on the other hand, is suggested as

characterizing local civil defense personnel who have completed more than 12 years of education and are full-time directors in urban centers.

An attribute space reduction is necessitated due to the $2^3 = 8$ combinations possible in recombining the three single attributes and at the same time retain sizable subgroups. The localite subgroup of 132 individuals includes the 36 local directors who are consistent on the three dimensions plus 96 individuals who are inconsistent but possess two dimensions indicative of a localite orientation and one cosmopolite dimension. In a similar manner the cosmopolite subgroup includes 28 local directors consistent on the three cosmopolite indicators plus 80 individuals characterized by two cosmopolite dimensions and one localite attribute.

Causal Model Analysis

The general notion of causal models is discussed in Chapter 2 in indicating that a causal model as used in sociology is a set of linear additive recursive equation which represent an oversimplified model of reality (Land, 1969: 3). Such models as indicated by Blalock (1971a: 1) provide heuristic devices for broadening the scope of multiple linear regression which focuses on a single dependent variable and one or more independent variables of the form

$$Y_i = B_1X_1 + B_2X_2 + B_3X_3 \ . \ . \ . \ B_nX_n + e_i$$

Each recursive equation in the model is assumed to represent the causal process operant between the variables in that equation (Land, 1969: 4) and, as indicated by Blalock (1971a: 1), the development of causal models justifies treating each equation independently so that the coefficients (B_i) can be estimated by ordinary least squares procedures. The basic purpose of applying the multiple regression procedure to each equation is, as indicated by Darlington (1968: 161), to estimate the coefficients for the independent variable so that the weighted composite ($\hat{Y}$) or predicted value on the dependent variable is maximally correlated with the observed values (Y_i) on the dependent variable. The degree of congruence between predicted and observed scores on the dependent variable is a measure of the usefulness of any particular equation and independent variables thereof in accounting for the observed variation in the dependent variable and is summarized by the coefficient of determination (R^2) as determined by the general formula (Rao and Miller, 1971: 14):

$$R^2 = \frac{\text{Variation explained by the regression equation}}{\text{Total variation on the dependent variable}}$$

One approach to causal model analysis which has been used extensively in sociology is path analysis as introduced by

Duncan (1966) in integrating the efforts of Blalock, Simon, Costner and Leik and, in particular, the work of Wright (1934) in population genetics. A brief discussion of this technique and its application to sociological data is, therefore, presented below.

Path coefficients

Path coefficients (P_{ij}) as indicated by Land (1969: 8-9) and Wright (1934: 162) measure the fraction of the standard deviation on the dependent variable (with appropriate sign) for which the independent (causal) variables are directly responsible with respect to

> ...the fraction which would be found if this factor varies to the same extent as in the observed data while all other variables (including residual variables) are constant.

The utilization of path analysis and path coefficients have several implicit contributions for the interpretation of causal models as indicated by Land (1969: 12-17) and Wright (1971: 106-114). These contributions are:

1. The standardized path coefficients as estimated by the formula

$$P_{ij} = b_{ij} \frac{\sigma_j}{\sigma_i} \text{ or } P_{ij} = Rxx^{-1}Rxy$$

generally vary between +1.0 and -1.0[1] and provide greater convenience in interpreting the relative usefulness or importance of causal variables in the model.

2. Path analysis provides a convenient interpretation of the coefficient of alienation ($1-R^2$) as the path coefficient of the residual term in the causal equation as estimated by the formula

$$P_{iu} = \sqrt{1-R^2} \equiv \sqrt{1-p_{ij}r_{ij}}$$

3. Path coefficients provide a convenient interpretation[2] of the correlation between causal and dependent variables as the sum of the direct effect of the causal variable on the dependent variable as estimated by the path coefficient plus the indirect effects of the causal variable as estimated by the product of the correlation coefficient of the causal

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[1]Path coefficients may exceed +1.0 or -1.0 in absolute value which indicates that the direct action of the causal variable in question is tending to bring about greater variability in the dependent variable than is actually observed and the direct effect of that causal variable must be offset by opposing effects of other causal variables (Wright, 1971: 107).

[2]An assessment of the total impact of a hypothetical change in an independent variable via its direct and indirect paths on the dependent variable is also possible with unstandardized partial regression coefficients as indicated by Blalock (1967: 676) by multiplying the unstandardized coefficients. However, this procedure does not appear to be as straightforward as in using path and correlation coefficients and in particular where multiple indirect paths are involved.

variables and the path coefficients of the other causal variable(s), as in the formula

$$r_{ij} = p_{ij} + r_{jk}p_{ik}$$

4. Path analysis provides a general procedure for evaluating the indirect effects of a causal variable on the dependent variable(s) in a multivariate causal model where the total indirect effect (TIE) = $r_{ij} - p_{ij}$.

As indicated above and as suggested by Blalock (1971a: 74), path coefficients have certain advantages over unstandardized regression estimates, but, as argued by Blalock (1971b: 145 and 1967: 675), Bohrnstedt (1969: 120-121), and Schoenberg (1972: 4-5), standardized estimates such as path coefficients are more appropriate if the research objective is to assess the relative importance of causal variables in a given population or research sample, whereas unstandardized regression coefficients[1] are more appropriate for comparing populations in ascertaining whether the underlying causal processes are

[1]The unstandardized coefficient $b_{ij \cdot k}$ respresents the change in the dependent variable produced by a unit change in the causal variable(s) and does not assume that the independent variable has or will change whereas the use of standard deviations in estimating path coefficients involve actual variations in the independent and dependent variables (Blalock, 1971b: 146).

basically similar and for the statement of hypothetical "if-then" causal laws. The unstandardized coefficients are relatively stable across subpopulations whereas the standardized estimates may vary significantly as a function of the standard deviations (Bohrnstedt, 1969: 120-121). The models and assumptions underlying the use of path coefficients or unstandardized coefficients are fundamentally the same and the difference between the two estimates partly involves the question of kinds of measures to utilize (Blalock, 1971a: 74). In corresponding to different modes of interpretation Wright (1971: 114) indicates that the two estimates taken together yield a deeper understanding of the causal processes of concern than either estimate can give by itself. In addition, Duncan (1970: 46) indicates that

> ...the contribution of path analysis, whether accomplished with (standardized) path coefficients or with (unstandardized) path regression coefficients, does not consist so much in rationalizing calculations of explained variance or in evaluating the "relative importance" of variables as in making explicit the formulation of assumptions that must precede any such calculation if they are to yield intelligible results.

The major focus in the interpretation of results in the dissertation is concerned with assessing the differential relative importance of causal variables within each subgroup on the basis of standardized path coefficients. The corresponding unstandardized regression coefficient estimates are also presented and discussed in order to provide a further assess-

ment of the moderator variables in differentiating the subgroups in relation to the underlying causal relationships. Although the two types of coefficients are employed for different purposes - comparison of causal processes between subgroups and the intelligible assessment of relative importance of causal variables within subgroups--the two estimates do retain a certain degree of comparability in that: (1) the relative importance[1] of the independent variable(s) in "contributing to," "accounting for," or "explaining" the observed variation in the dependent variable(s) is the same for each causal variable irrespective of whether their effects are estimated by path or unstandardized regression coefficients (Darlington, 1968: 165-166); and (2) the order of selection of causal variables in entering the causal equation as based on the change in explained variation (R^2) and the F value thereof is the same for both path and unstandardized stepwise regression procedures.

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[1]Relative importance or usefulness of a specific causal variable within this context refers to the amount by which multiple correlation coefficient (R^2) changes as a result of adding or subtracting the variable from the regression equation. The statistical significance of the amount by which the value of R^2 or sums of squares regression changes is determined by the formula

$$F=t^2=\frac{\text{SS regression (full model)} - \text{SS regression (partial model)}}{\text{MS residual (full model)}}$$

$$\equiv \frac{b_{ij}^2}{SEb_{ji}} \equiv \frac{p_{ji}^2}{SEp_{ij}}.$$

Stepwise regression

In attempting to establish a linear regression equation for a particular dependent variable in terms of a set of independent variables, Draper and Smith (1966: 163) indicate that two opposing criteria for selecting an equation are:

1. In attempting to explain or account for as much of the variation as possible, it is desirable to include as many independent variables as possible.

2. It is also desirable to include as few independent variables as possible due to the costs involved in obtaining data on a large number of causal variables.

One statistical procedure for selecting the best regression equation in reaching a compromise between these extremes is stepwise regression (Draper and Smith, 1966: 163) which is an iterative procedure for selecting one variable at a time to enter the equation and as indicated by Nie et al. (1970: 180) is an efficient method of providing a near-optimum solution to the problem. The stepwise regression procedure is utilized in selecting the best regression equation within each subgroup in the analysis of the data. The stepwise regression procedure available in the Statistical Package for the Social Sciences[1] computer program utilized in the analysis section provides estimates for the coefficient of determination (R^2) and estimates for both unstandardized

[1]See Nie et al. (1970).

regression and path coefficients in enabling a comparison of causal relationships between subgroups as well as a comparison of the efficacy of causal variables within subgroups.

Empirical Evaluation of "Moderating" Effects

The moderator variable approach being followed in the dissertation is that of heterogenous regression which, as indicated by Velicer (1972b: 266) and Saunders (1956: 209), assumes that the total research sample is, in reality, two or more subgroups in which the "best-fitting" regression equation varies as a function of membership in one or another of the subgroups which are presumed to be distinct and homogeneous. As a result, different "best-fitting" regression equations are used in each subgroups in the expectation that the results as measured by the multiple correlation coefficient are superior to the results of using one regression equation for all subgroups. The greatest advantage of the model, as suggested by Cleary (1966: 216-217), in assigning different regression coefficients to each subgroup is that it offers an empirical method for ascertaining whether an improvement in R^2 will be gained by deviating from the usual multiple regression model and how many subgroups are required for a maximal improvement.

The regression equation as indicated by Velicer (1972b: 266-267) may be differentiated in two ways: (1) the regression

weights may differ in relation to the parallelism of the "moderated" regression lines; and (2) the regression lines may be parallel but differ in location. Two tests are thus necessitated: (1) a test for difference of regressions parallelism; and (2) a test for the difference of location. Analysis of covariance in combining the advantages and requirements of regression analysis and analysis of variance (Cochran, 1971: 179) is an appropriate statistical procedure for carrying out these different tests. However, in the empirical evaluation of the causal model, variables whose contributions (as determined by the increase in explained variation in the dependent variable(s)) to the regression equation are not statistically significant at the .05 level are eliminated from the analysis and the causal model in accordance with Duncan's (1966: 7) recommendation for retaining only those independent variables found to be statistically and substantively significant. The values for the coefficient of determination (R^2) are also based on only those causal variables for which the causal parameter estimates are significant at the 5 percent level. As a result the specific independent variables and number of independent variables retained in each of the subgroups do not necessarily coincide whereby the analysis of covariance model is deemed to be inappropriate for the purposes of the dissertation.

Criteria for comparison

The differentiating effects of the moderator variables will therefore be assessed on the basis of three criteria. First, the differences in location are assessed on the basis of "t" tests in assessing the statistical significance of observed mean score differences observed on the eight causal model variables between the two subgroups within each of the moderator variable categories. The differences in regression equations or the "parallelism" of lines are assessed by comparing the relative importance of and number of variables entering each causal equation within each subgroup on the basis of path coefficients and F values respectively. Unstandardized partial regression coefficients are also utilized in making comparisons between subgroups.

The third criterion in assessing the relative efficacy of differential regression equations across subgroups as reflected in the R^2 values for each dependent variable is based on the construction of confidence intervals around the multiple correlation coefficient ($R_{ij \cdot k}$) by transforming to standard z values and applying the formula suggested by Blalock (1972: 467)

$$z \pm t \left(\frac{1}{\sqrt{N-k-2}}\right)$$

where k = number of independent variables included on the determination of $R_{ij \cdot k}$.

The application of the above formula in constructing confidence intervals thus permits a statistical assessment of differential R^2 values between subgroups in ascertaining if the observed differentials are significantly different or if the observed differences should be more properly viewed as chance events. At the same time the inclusion of an adjustment in the degrees of freedom in the standard error enables the differential number of independent variables included in each equation on the basis of F values to be reflected in the comparisons between subgroups.

In recognizing that the number of independent variables entering into the determination of the R^2 may vary between subgroups, it is often necessary to ascertain that the observed differences on the coefficients of determination are due to the inclusion of significant terms and are not due to the inclusion of differential number of independent variables. The coefficient of determination (R^2) as a measure of the usefulness of the terms (other than the intercept) in the causal equation can be increased simply by increasing the number of independent variables in the equation (Draper and Smith, 1966: 62-63). The introduction of additional terms in an equation in necessarily giving a higher R^2 value and a smaller sums of squares residual imposes extra constraints on the equation (Rao and Miller, 1971: 20) as the number of parameters approaches the saturation point, i.e., the number of observations (Draper and Smith, 1966: 63). The corrected

coefficient of determination or shrunken multiple correlation coefficient is a recommended statistical procedure for adjusting the R^2 values in accordance with the number of parameter estimates included in determining these values. Two synonymous formulae are:

$$\bar{R}^2 = 1 - \frac{MS_{res}}{\Sigma y^2} \equiv 1 - (1-R^2)\ \frac{N-1}{N-k-1}$$

where

k = number of independent variables included in the equation.

As a result of including an adjustment for the number of independent variables, the statistic $\bar{R}^2$ can decrease when an additional variable is included whereas R^2 necessarily increases. Due to the small number of independent variables (7) which may potentially enter any equation in relation to the total n_i in any subgroup the shrunken multiples are not computed in the analysis of the data as the adjustment factor $\frac{N-1}{N-k-1}$ is approximately 1.0.

It is recognized, however, that statistical procedures such as the corrected coefficient of determination should be applied in fitting regression equations to a set of data for the above cited reasons in order to avoid making fallacious interpretation that the equation which yields the largest R^2 (the least $MS_{residual}$) is the most desirable. In addition, $\bar{R}^2$ is used in adjusting the sample estimate R^2 for the

population in minimizing the $SS_{residual}$, in that if other samples were to be taken a smaller R^2 value would likely be obtained.

Assessment of Measurement Procedures

One of the original purposes of the moderator variable technique and which forms a basic objective of the dissertation is the improvement of social science measurement procedures. Two sets of criteria are applied to the five composite measures--socialization, scope, pervasiveness, salience and role performance--in assessing the effects of moderator variables on the measurement of sociological concepts.

Reliability of measurement

The concept of reliability of measurement does not, as indicated by Cattell (1967: 59-60), lack from mathematical and statistical sophistication but does suffer from an absence of common agreement or even mutual understanding as suggested by Coombs (1950: 43-45) in stating that:

> We set up these statistical indices based on operational procedures, then give names to them and act as if they have certain obvious...meanings. We have gained readily obtainable empirical indices but have paid for them in ...ambiguity and imprecise meanings and interpretation.... Thus, we have not one but many indices of reliability, each determined in a different way, and hence each implying a different meaning.

A basic question, which, therefore, arises is the appropriateness of any particular estimate of reliability. In recognition of the continuing debate as to the most appropriate measure of reliability, coefficient alpha[1] is employed for all composite scales in order to provide a degree of comparability and consistency across subgroups. It is generally assumed that alpha is a lower bound or conservative estimate to "the reliability coefficient" (Cronbach, 1967: 141). As such, the application of coefficient alpha in statistical procedures such as correction for attenuation and errors-in-variables may tend to overly inflate the coefficient or variable being corrected. However, Nunnally (1967: 211) and Cronbach (1967: 142-143) indicate that alpha provides a good estimate of reliability in most situations in that the major source of measurement error is due to the sampling of content. Coefficient alpha is the same type of coefficient as the split-half coefficient, and while it may be lower, it may also be higher than the value obtained by actually splitting a particular test at random.

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[1] $\alpha = \frac{k}{k-1}\left(1 - \frac{\Sigma\theta_i^2}{\theta_T^2}\right)$ as determined from SPSS Subprogram Reliability (see Specht, 1973).

Statistical assessment of reliability estimate differentials Due to the lack of appropriate statistical distributions for coefficient alpha and other reliability estimates, the statistical significance of observed differences between subgroups is assessed on the basis of a χ^2 test for the equivalencey of the variance-covariance matrices from which the estimates of coefficient alpha are derived. To test the hypothesis that the covariance matrices are equal the following statistic presented by Winer (1972: 595-599) is computed:

$$\chi^2 = (1-C_1)M_1 \text{ with } f_1 \text{ degrees of freedom}$$

in which

$$M_1 = N \ln|S_{pooled}| - \Sigma n_i \ln|S_i|$$

$$C_1 = \frac{2q^2+3q-1}{6(q+1)(p-1)} \left[\Sigma\left(\frac{1}{n_i}\right) - \frac{1}{N}\right]$$

$$f_1 = \frac{q(q+1)(p-1)}{2}$$

where

q = number of levels or items in the matrix

p = number of groups.

Rejection of the hypothesis of equivalency of the covariance matrices rules against pooling the matrices as an unbiased estimate of the population covariance matrix.

Other criteria for comparison

Further criteria for comparing the effects of subgrouping research populations on the resultant composite measures are the criteria set forth by Warren et al. (1969) with respect to obtaining summated scores for multi-item scales.

The major criterion set forth is that of additivity, which as Warren et al. (1969: 13-18) indicate, is considered to be one of the most important properties of a scale. Three conditions which are deemed to be necessary for the legitimate addition of scale items are:

1. The relationships among the item responses must be linear as determined from:
   (a) the item-total correlation being greater than $1/\sqrt{k}$ - the minimum acceptable - where k is the number of items included in the scale;
   (b) the magnitude of the coefficient of reliability (α);
   (c) the magnitude of the average inter-item correlation ($\bar{r}_{ij}$);
   (d) the magnitude of a majority of the inter-item correlations (r_{ij}).

A linear relationship between scale items is considered to be present if these four conditions are evidenced.

2. The variance of the responses to the different items must be homogenous and independent of the item means. This criterion is evaluated by inspecting the pattern of relationships between the item means, item standard deviations and the range of item standard deviation.
3. The inter-item correlations must be positive and homogenous where homogenity can be considered to be present if sixty percent of the inter-item correlations (r_{ij}) fall within a relatively small range.

These criteria are applied to the five composite scales in assessing the degree to which the scales can be considered to be valid, reliable, internally consistent and unidimensional within each of the subgroups.

CHAPTER 6. DATA ANALYSIS AND FINDINGS

Introduction

The causal model of effectiveness in organizations as formulated and evaluated by Mulford et al. (1972a) and presented in Chapter 4 is subjected to further empirical evaluation in this chapter in assessing the effects of subgrouping the total research sample on: (1) causal parameter estimates and causal inferences therefrom; and (2) the measurement of substantive variables encompassed by the model. Parameter estimates for variables whose contribution (as determined by F values in relation to the increased explained variation in the dependent variable(s)) to the regression equation are not statistically significant at the .05 level are eliminated from the analysis and path model in accordance with Duncan's (1966: 7) recommendation presented in Chapter 5. The values for the coefficient of determination (R^2) are also based on those variables for which causal parameter estimates are statistically significant at the .05 level.

The data analysis and discussion of findings are presented in six sections. First, the causal parameter estimates and assessment of measurement procedures for the total research sample are presented as a basis for comparing the effects of subgrouping the research sample on causal inferences and efficacy of composite measurement techniques.

The next four sections are devoted to estimating the causal parameter and an evaluation of composite measurement procedures within each of the "moderated" subgroups-education, jurisdictional location, time-pay status and cosmopolite-localite orientation - which are hypothesized as differentiating the research population of local civil defense directors with respect to the causal and measurement relationships under consideration.

The final section in this chapter is concerned with a general summary of the influence of moderator variables on the relationships of concern as a basis for developing the theoretical and methodological implications of the moderator variable approach to causal model analysis and the measurement of sociological variables presented in Chapter 7.

Total Research Sample

In order to meaningfully assess the hypothesized "moderating" effects of subgrouping on the basis of antecedent background attributes of the organizational participants, it is necessary to examine the undifferentiated or total research sample estimates of causal parameters and summarizing statistics for the measurement of composite variables. The following data analysis is, therefore, concerned with evaluating the causal model of effectiveness in organizations and assessment of measurement procedures for the total research

sample (N=240) of local civil defense participants.

Evaluation of the causal model

The causal relationships in the model of organizational effectiveness are evaluated on the basis of unstandardized and standardized (path) partial regression coefficients. As indicated previously one of the major criteria for the making of causal inferences is that the variables are correlated whereby observed variations in the dependent variable(s) are associated with observed variations on the independent variable(s) entering into the causal relationships. The zero-order correlation coefficients[1] which are indicative of the relative magnitude of the degree of association between variables and which form the basis for the stepwise estimation of partial regression coefficients are presented in Table 4. Other descriptive statistics for the eight variables in the causal model are also presented in Table 4. The causal parameter estimates as computed by the stepwise regression procedure are presented in Table 5.

On the basis of the statistically significant causal relationships and the elimination of nonsignificant parameter estimates, the causal model and path estimates for the total research sample are presented in Figure 2.

[1]The correlation coefficients are estimated by the Pearson product moment coefficient of correlation.

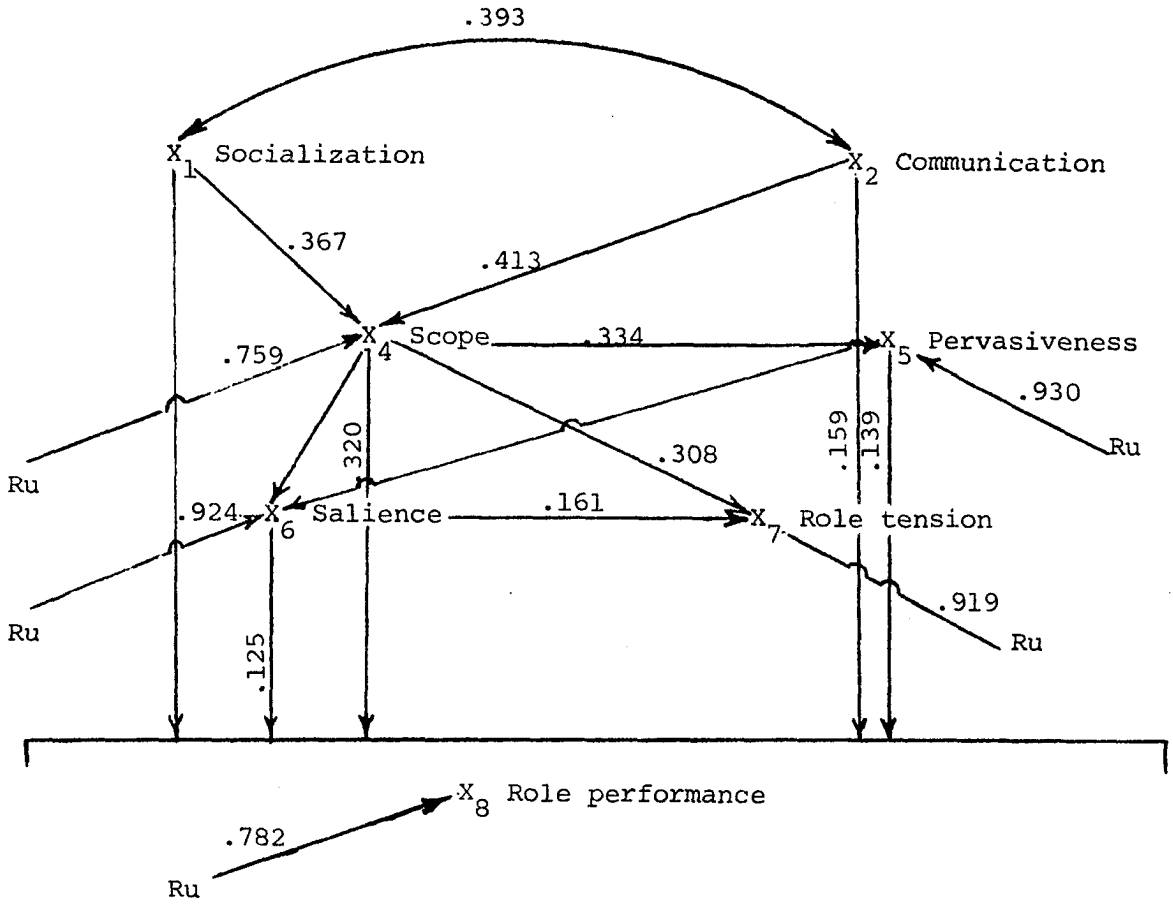

Figure 2. Empirically evaluated causal model of effectiveness in organizations for total research sample (N=240)

The utilization of standardized path coefficients permits a straightforward interpretation of the direct effects and total indirect effects of the independent causal variables on each of the dependent variables in the causal model. These effects as determined for the statistically significant causal relationships are summarized in Table 6.

Table 4. Correlation matrix, means and standard deviations of causal model variables for total research sample (N=240)

Variable	Zero-order Correlation Coefficient							Mean	S.D.
X_1 Socialization	-							23.00	5.15
X_2 Communication	.393**	-						91.05	27.02
X_3 Selectivity	.280**	.259**	-					3.22	1.24
X_4 Scope	.529**	.557**	.330**	-				14.58	4.68
X_5 Pervasiveness	.230**	.220**	.156*	.368**	-			5.80	3.70
X_6 Salience	.136*	.207**	.175*	.347**	.276**	-		215.45	28.19
X_7 Role tension	.198**	.205**	.029	.364**	.063	.268**	-	12.49	4.39
X_8 Role Performance	.400**	.426**	.290**	.564**	.370**	.326**	.242**	- 1542.15	517.72

*Significant at .05 level.

**Significant at .01 level.

Table 5. Partial regression estimates[a] of causal relationships for total research sample (N=240)

Dependent and Independent Variables	F Value	Partial Regression Coefficient	Path Coefficient	R^2
X_4 SCOPE				.4244
X_1 Socialization	46.87	0.333	.367	
X_2 Communication	59.47	0.071	.413	
X_5 PERVASIVENESS				.1352
X_1 Socialization	-	-	-	
X_2 Communication	-	-	-	
X_4 Scope	37.22	0.265	.334	
X_6 SALIENCE				.1459
X_3 Selectivity	-	-	-	
X_4 Scope	19.28	1.708	.283	
X_5 Pervasiveness	7.12	1.311	.173	
X_7 ROLE TENSION				.1551
X_3 Selectivity	-	-	-	
X_4 Scope	23.42	0.289	.308	
X_5 Pervasiveness	-	-	-	
X_6 Salience	6.37	0.025	.161	
X_8 ROLE PERFORMANCE				.3883
X_1 Socialization	4.07	12.374	.123	
X_2 Communication	4.98	2.660	.139	
X_3 Selectivity	-	-	-	
X_4 Scope	19.76	35.389	.320	
X_5 Pervasiveness	8.05	22.166	.159	
X_6 Salience	5.11	2.303	.125	
X_7 Role tension	-	-	-	

[a]Regression coefficients statistically significant at .05 level only included.

Table 6. Direct and total indirect effects (TIE) of causal variables[a] on dependent variables[b] for the total research sample (N=240)

Dependent and Independent Variables	Direct Effect	Total Indirect Effects
X_4 SCOPE		
X_1 Socialization	.367	.167
X_2 Communication	.413	.144
X_6 SALIENCE		
X_4 Scope	.283	.064
X_5 Pervasiveness	.173	.103
X_7 ROLE TENSION		
X_4 Scope	.308	.056
X_6 Salience	.161	.107
X_8 ROLE PERFORMANCE		
X_1 Socialization	.123	.277
X_2 Communication	.139	.287
X_4 Scope	.320	.244
X_5 Pervasiveness	.159	.210
X_6 Salience	.125	.200

[a]Indirect effects calculated on independent variables for which statistically significant parameter estimates are observed.

[b]Indirect effects calculated for dependent variables on which statistically significant multiple paths are observed.

Discussion of undifferentiated evaluation of the causal model As indicated in Table 4 all the zero-order variable relationships as estimated by the Pearson product moment correlation coefficient are statistically significant at least the 5 percent level with the exception of the relationships

between role tension and selectivity and between pervasiveness and role tension. Although correlation is no "proof" of causality, the lack of a statistically significant relationship between these variables resulted in the nonsupport of the hypothesized causal relationships between selectivity and role tension and between pervasiveness and role tension. Of theoretical significance in being generally supportive of the hypothesized relationships are the range of correlation coefficients from .290 to .564 between the seven causal variables and role performance although only five of these relationships are statistically supported on the basis of causal parameter estimates.

In assessing the relative importance of the independent variables with respect to their direct and total indirect effects on the dependent variables for the undifferentiated research sample, it is noted from Table 5 and Table 6 that slightly more of the 42.44 percent of the explained variation on organizational scope is referrable to communication than to socialization with respective direct effects of .413 and .367 and total indirect effects of .144 and .167 respectively. Similar comparisons of the direct and total indirect effects of "competing" causal variables on a common dependent variable indicate that: (1) organization scope is relatively more important in explaining 14.59 percent of the observed variation on salience than is pervasiveness with total effects (direct

Table 7. Characteristics of composite measurement scales for total research sample (N=240)

Composite Scale Criteria	X_1 Socialization	X_4 Scope	X_5 Pervasiveness	X_6 Salience	X_8 Role Performance
Coefficient of reliability[a]	.513	.533	.919	.763	.570
Average inter-item correlation	.210	.191	.534	.192	.307
Range of inter-item correlations	.02 to .38	-.01 to .44	.33 to .76	-.07 to .59	-.07 to .75
Range containing 60% of inter-item correlations	.09 to .28	.08 to .27	.45 to .62	.12 to .28	.14 to .47
Range of means	3.74 to 7.22	1.02 to 8.13	0.45 to 0.70	11.14 to 15.15	66.51 to 561.75
Range of standard deviations	1.58 to 2.28	1.00 to 2.78	0.46 to 0.50	2.08 to 5.14	27.05 to 228.29

[a]Coefficient alpha.

and total indirect effects) of .347 and .256 respectively; (2) a greater relative proportion of the observed variation on role tension is explained by scope relative to salience whose respective direct effects are .308 and .161 with total indirect effects of .056 and .107 respectively; and (3) the total effects (direct and total indirect effects) of the five statistically significant causal variables in explaining 38.83 percent of the observed variation on role performance in descending order of relative importance are scope, communication, socialization, pervasiveness, and salience with respective path values of .320, .139, .123, .159 and .125 and total indirect effects of .244, .287, .277, .210 and .200 respectively.

Assessment of composite measures

In hypothesizing that one of the most important contributions of the moderator variable concept to empirical research is its implications for the measurement of social science variables, the following analysis and discussion are devoted to an assessment of the reliability and other scale analysis criteria for the five composite measures-socialization, scope, pervasiveness, salience and role performance-utilized in the causal model for the research sample as a whole.

A general summary of the characteristics of the five

composite scales in relation to the criteria being used in the analysis is presented in Table 7. The correlation matrices and accompanying corrected item-total correlations, item means and item standard deviations for the socialization, scope, pervasiveness, salience and role performance scales are included in Appendices A, D, E, F and H respectively.

As indicated in Table 7 and Tables 37, 46, 55, 64 and 73 in the Appendices, the composite scales are characterized by divergent degrees of efficacy in meeting the scale analysis criteria being employed in the analysis, with reliability coefficients ranging from .513 for the socialization scale to .919 for the composite measure of pervasiveness. The largest average inter-item correlation of .534 is also evidenced by the pervasiveness scale with the composite measure of scope being characterized by the lowest average inter-item correlation of .191. The smallest range of inter-item correlations of .16 is evidenced by the socialization scale in comparison to the largest range of inter-item correlations (.82) characterizing the measure of role performance. The composite role performance scale also exhibits the largest range containing 60 percent of the inter-item correlations of .43, the largest range of means of 495.24 and the largest range of standard deviations of 201.24 whereas the smallest

range of inter-item correlations of .36 is evidenced by the measure of socialization, the smallest range of .16 containing 60 percent of the inter-item correlations being a characteristic of the salience scale with the pervasiveness composite measure evidencing the smallest range of means and standard deviations of 0.25 and 0.04 respectively. In assessing the scales in relation to the minimum item-total criterion from Tables 37, 46, 55, 64 and 73 all 10 items of the composite pervasiveness scale meet the criterion with 14 of 16 items in the salience scale, 5 of 7 for the role performance scale, 1 of 5 for the measure of scope and none of the four items in the composite measure of socialization had corrected item-total correlations greater than the minimum criterion. The five scales also exhibited differing percentages of statistically significant inter-item correlations with all inter-item correlations in the socialization and pervasiveness scales being greater than zero.

Discussion of total research sample assessment of composite measurement scales As indicated in Table 7 which summarizes the characteristics of the socialization, scope, pervasiveness, salience and role performance composite measures from their respective Appendices Tables 37, 46, 55, 64, and 73 all the scales do not meet the scale analysis criteria equally well and thus exhibit differential degrees of

linearity, unidimensionality and homogeneity. However, the major purpose in presenting the assessment of the composite measures for the total research sample is not to evaluate the relative merits of the five scales per se but is presented as a benchmark in providing one basis for assessing the hypothesized differentiating effects of moderator variables on composite measurement procedures to be presented in the subsequent sections of this chapter.

Subgrouping by Educational Background

Two educational subgroups are formed on the basis of the number of years of formal education completed by the local civil defense directors in evaluating the hypothesized effects of divergent educational backgrounds on: (1) differential variable relationships in the causal model of effectiveness in organizations; and (2) differential errors of measurement and other composite scaling criteria. The two subgroups with respective sizes of 123 and 117 are: (1) local directors with 12 or less years of education; and (2) local civil defense personnel who have completed more than 12 years of education.

Evaluation of the causal relationships

The hypothesized effects of subgrouping the total research sample on the location of the regression lines are evaluated on the basis of the mean values for the eight variables in the

causal model as shown in Table 8. The observed mean differences are statistically significant at the .05 level for salience and pervasiveness with the higher mean values being evidenced for the subgroup completing more than 12 years of formal education.

Table 8. Causal and dependent variable means and standard deviations for formal education

Variable	Subgroup 1[a] (n_1=123)		Subgroup 2[b] (n_2=117)	
	Mean	Standard Deviation	Mean	Standard Deviation
X_1 Socialization	22.66	5.59	23.36	4.64
X_2 Communication	87.95	29.18	94.31	24.24
X_3 Selectivity	3.15	1.14	3.29	1.35
X_4 Scope	14.51	4.80	14.65	4.57
X_5 Pervasiveness	5.29*	3.66	6.33*	3.69
X_6 Salience	211.17*	28.36	219.95*	27.40
X_7 Role tension	12.68	4.14	12.28	4.64
X_8 Role performance	1491.22	500.56	1558.78	535.13

[a]Completed 12 or less years of formal education.

[b]Completed more than 12 years of formal education.

*Observed mean differences between subgroups significant at .05 level.

Table 9. Correlation matrix of causal model variables for educational subgroup with 12 or less years of formal education (n_1=123)

Variable	Zero-order correlation coefficients							
X_1 Socialization	-							
X_2 Communication	.433**	-						
X_3 Selectivity	.399**	.315**	-					
X_4 Scope	.630**	.558**	.347**	-				
X_5 Pervasiveness	.222*	.178*	.195*	.361**	-			
X_6 Salience	.057	.097	.173	.168	.156	-		
X_7 Role tension	.270**	.195*	.036	.333**	.177*	.225*	-	
X_8 Role performance	.491**	.414**	.264**	.569**	.356**	.206*	.259**	-

*Significant at .05 level.

**Significant at .01 level.

Table 10. Correlation matrix of causal model variables for educational subgroup with more than 12 years of formal education (n_2=117)

Variable	Zero-order correlation coefficients							
X_1 Socialization	-							
X_2 Communication	.320**	-						
X_3 Selectivity	.158	.198*	-					
X_4 Scope	.399**	.565**	.263**	-				
X_5 Pervasiveness	.227*	.244**	.112	.379**	-			
X_6 Salience	.219*	.319**	.163	.555**	.372**	-		
X_7 Role tension	.128	.236**	.028	.398**	.028	.331**	-	
X_8 Role performance	.294**	.439**	.307**	.562**	.373**	.436**	.235**	-

*Significant at .05 level.

**Significant at .01 level.

Table 11. Partial regression estimates[a] of causal relationships for formal education subgroups

Dependent and Independent Variables	Subgroup 1[b] (n_1=123) F Value	Partial Reg. Coef.	Path Coef.	R^2	Subgroup 2[c] (n_2=117) F Value	Partial Reg. Coef.	Path Coef.	R^2
X_4 SCOPE				.4963				.3724
X_1 Socialization	44.16	0.409	.478		9.64	.239	.243	
X_2 Communication	23.80	0.058	.351		38.73	.092	.487	
X_5 PERVASIVENESS				.1300				.1439
X_1 Socialization	-	-	-		-	-	-	
X_2 Communication	-	-	-		-	-	-	
X_4 Scope	18.00	0.275	.361		19.33	0.306	.319	
X_6 SALIENCE								.3386
X_3 Selectivity	-	-	-		-	-	-	
X_4 Scope	-	-	-		34.46	2.898	.483	
X_5 Pervasiveness	-	-	-		5.27	1.403	.189	
X_7 ROLE TENSION				.1407				.2273
X_3 Selectivity	-	-	-		-	-	-	
X_4 Scope	12.56	0.262	.304		13.31	0.378	.372	
X_5 Pervasiveness	-	-	-		7.48	-0.314	-.250	
X_6 Salience	4.12	0.025	.174		4.59	0.037	.218	
X_8 ROLE PERFORMANCE				.3794				.1597
X_1 Socialization	5.68	19.817	.221		-	-	-	
X_2 Communication	-	-	-		-	-	-	
X_3 Selectivity	-	-	-		4.76	66.762	.169	
X_4 Scope	14.19	38.199	.366		29.05	52.379	.447	
X_5 Pervasiveness	5.12	23.993	.175		5.26	26.779	.185	
X_6 Salience	-	-	-		-	-	-	
X_7 Role tension	-	-	-		-	-	-	

[a]Regression coefficients statistically significant at .05 level only included.

[b]Completed 12 or less years of formal education.

[c]Completed more than 12 years of formal education.

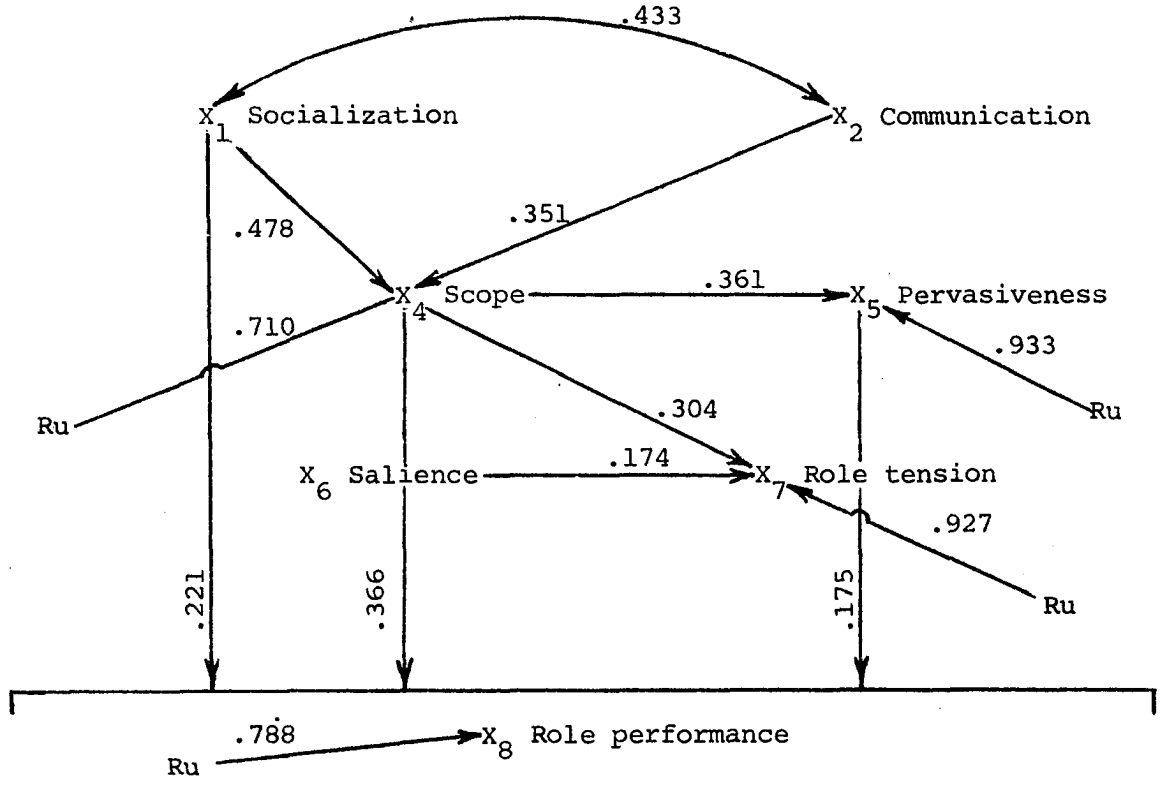

Figure 3. Empirically evaluated causal model of effectiveness in organizations for educational subgroup with 12 or less years of formal education (n_1=123)

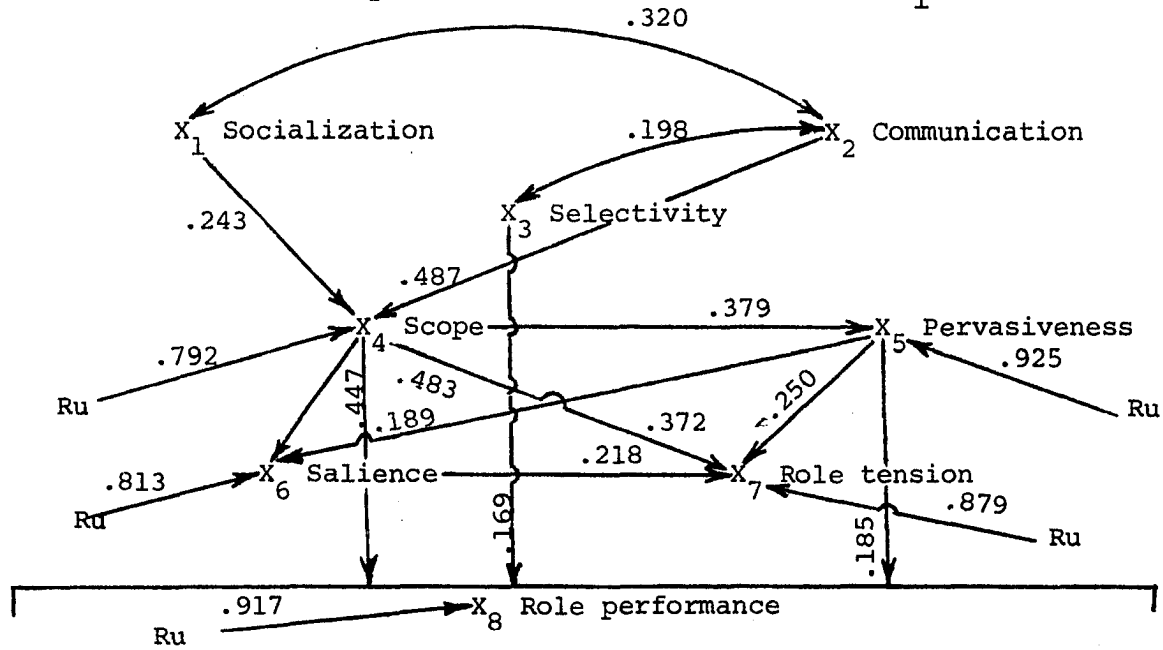

Figure 4. Empirically evaluated causal model of effectiveness in organizations for educational subgroup with more than 12 years of formal education (n_2=117)

Table 12. Direct and total indirect effects (TIE) of causal variables[a] on dependent variables[b] for formal educational subgroups

Dependent and Independent Variables	Subgroup 1[c] (n_1=123)		Subgroup 2[d] (n_2=117)	
	Direct Effect	Total Indirect Effects	Direct Effect	Total Indirect Effects
X_4 Scope				
X_1 Socialization	.478	.152	.243	.156
X_2 Communication	.351	.207	.487	.078
X_6 SALIENCE				
X_4 Scope	-	-	.483	.072
X_5 Pervasiveness	-	-	.189	.183
X_7 ROLE TENSION				
X_4 Scope	.304	.029	.372	.026
X_5 Pervasiveness	-	-	-.250	.278
X_6 Salience	.174	.051	.218	.113
X_8 ROLE PERFORMANCE				
X_1 Socialization	.221	.270	-	-
X_3 Selectivity	-	-	.169	.138
X_4 Scope	.366	.203	.447	.115
X_5 Pervasiveness	.175	.181	.185	.188

[a]Includes only independent variables significantly related to the dependent variable(s).

[b]Indirect effects computed only on dependent variables for which multiple paths are involved.

[c]Completed 12 or less years of formal education.

[d]Completed more than 12 years of formal education.

Observed differentials between the two educational subgroups are also in evidence in relation to the degree of association between the eight variables in the causal model as indicated in Table 9 and Table 10. The correlations between salience and socialization, communication, selectivity, scope and pervasiveness are not statistically significant at the .05 level as is the correlation between role tension and selectivity for the subgroup who have completed 12 or fewer years of formal education. In comparison, nonsignificant zero-order correlations for the subgroup with more than 12 years of education are evidenced for the relationships between: (1) socialization and selectivity; (2) socialization and role tension; (3) selectivity and pervasiveness; (4) selectivity and salience; (5) selectivity and role tension; and (6) pervasiveness and role tension. As a result of the above cited differentials between the two subgroups, differentials are also observed as indicated in Table 11 in the causal parameters as estimated by unstandardized and standardized partial regression coefficients and the resultant causal models presented in Figure 3 and Figure 4.

The direct and total indirect effects for the causal variables whose relationships with each of the dependent variables are statistically significant are presented in Table 12. Confidence intervals as computed for each of the multiple correlation coefficients ($R_{i \cdot jk}$) are shown in Table 13.

Table 13. Ninety-five percent confidence intervals for multiple correlation coefficients[a] for formal educational subgroups

Multiple Correlation Coefficient	Subgroup 1[b] (n_1=123)			Subgroup 2[c] (n_2=117)		
	Value	Lower Limit	Upper Limit	Value	Lower Limit	Upper Limit
$R_{4.}$	.7045	.59	.78	.6102	.48	.71
$R_{5.}$	.3605	.20	.51	.3793	.21	.52
$R_{6.}$	-	-	-	.5819	.45	.69
$R_{7.}$	.3751	.20	.52	.4768	.33	.61
$R_{8.}$	.6159	.48	.76	.3996	.24	.54

[a]Multiple correlation estimates based on independent variables whose parameter estimates are significant at .05 level.

[b]Completed 12 or less years of formal education.

[c]Completed more than 12 years of formal education.

Discussion of "moderator" effects of formal education on substantive causal relationships On the basis of the above results it would appear that formal educational background of the local civil defense coordinators functions as a "moderator" variable in differentiating the total research sample with respect to the causal efficacy of independent variables within each of the two subgroups. In particular it is suggested that the direct and total indirect effects of the socialization

process in explaining the observed variation on organizational scope and role performance is relatively more important than is the communication process for organizational participants who have completed 12 or less years of formal education. On the other hand the communication process is relatively more important in effecting organizational scope than is socialization for the local civil defense directors who have higher educational achievements (more than 12 years of formal education) and is possibly a reflection of the greater predispositions toward and abilities in effecting communications. It is to be noted, however, that the "job orientation" received by local directors with lesser educational attainments has a direct impact on both organizational scope and role performance whereas communication as the relatively more important variable for the directors with more than 12 years of formal education exhibits only indirect effects on subsequent organizational variables due to its direct effects on scope.

It is also suggested that individuals with more than 12 years of formal education may tend to be more "positively" selected or recruited into the civil defense organization in relation to the significant relationship between selectivity and role performance which is not evidenced by the participants with lesser educational achievements or by the total research sample. Of theoretical significance on the basis of the above analysis is the observation that organizational

salience is an exogenous variable for the local directors who have completed 12 or less years of education in that the observed variation on the salience variable is not statistically referable to any of the preceding causal variables.

The degree to which the local directors tend to limit their activities to the civil defense organization (scope) appears to have a relatively greater impact on: (1) the degree to which organizational norms influence the individuals' behavior outside the organization; (2) the level of role tension evidenced; and (3) the level of role performance effected by the local personnel with more than 12 years of formal education than is to be observed for the directors with lesser educational attainments.

The above analysis has tended to emphasize the differences between the two subgroups, but certain comparabilities are also evident for the local directors with divergent educational backgrounds. Although varying in magnitude, statistically significant parameter estimates are observed in both groups for the causal relationships between: (1) socialization and scope; (2) communication and scope; (3) scope and role tension; (4) salience and role tension; (5) scope and role performance; and (6) pervasiveness and role performance. These empirical results under divergent conditions tend to provide general support for the central place of socialization and communication in social organizations and for the need

for civil defense organization to encourage the local personnel to become jointly involved in organizational activities.

The above indications are based on the comparison of causal variables and standardized path coefficients within the two subgroups. Similar indications are also evidenced by comparing the unstandardized path coefficients across the two groups in that the unstandardized parameter estimate between socialization and scope for example decreased from .409 to .239 in moving from the lesser educated group to the more highly educated group whereas the unstandardized estimate between communication and scope changed from .058 for participants with lesser educational attainments to .092 for local directors who have completed more than 12 years of formal education. Similar trends are also observed in comparing the unstandardized partial coefficients for the relationships between scope and role tension and scope and role performance. The unstandardized estimate between scope and role tension is 0.378 for the directors with more than 12 years of formal education whereas the comparable estimate for the lesser educated group is 0.262. An unstandardized estimate of 38.20 is evident for the directors with 12 or less years of education in comparison to the estimated value of 52.38 for the more highly educated civil defense personnel for the relationship between scope and role performance.

On the basis of the confidence intervals established from the multiple correlation coefficients in the causal model and

presented in Table 12, there is statistical evidence that a greater proportion of the observed variation on role performance is accounted for by the subgroup with 12 or less years of formal education and by the undifferentiated research sample ($R_{8.}$ = .623) than is explained by the statistically significant parameter estimates for the educational subgroup with more than 12 years of formal education. With the exception of role performance and salience the data tends to indicate that the different independent variables entering the causal equations for the two educational subgroups at statistically significant levels are equally efficacious in accounting for the observed variation on the dependent variables - scope, pervasiveness and role tension.

On the basis of the results presented above it would appear that the primary effects of formal educational backgrounds on the causal equations are related to differentiating the total research sample with respect to the "parallelism" of the regression lines or the equivalency of the causal parameter estimates and not in the locational aspects although two of the variables are observed to have statistically significant different mean values.

In summary it is suggested that the causal efficacy or relative importance of "competing" causal variables in accounting for the observed variation on the dependent variables in the causal model of organizational effectiveness appears to be

Table 14. Characteristics of composite measurement scales for formal educational subgroups

Composite Scale	Subgroup 1[a] (n_1=123)				
Criteria	X_1 Socialization	X_4 Scope	X_5 Pervasiveness	X_6 Salience	X_8 Role Performance
Coefficient of Reliability[c]	.563*	.562*	.911	.737*	.556**
Average inter-item correlation	.251	.240	.507	.168	.291
Range of inter-item correlations	.033 to .387	.008 to .461	.232 to .770	-.115 to 6.17	-.131 to .137
Range containing 60% of inter-item correlations	.119 to .359	163 to .297	.413 to .594	.100 to .295	.05 to .46
Range of means	3.76 to 6.95	0.85 to 8.16	0.34 to 0.67	0.56 to 15.20	62.46 to 519.86
Range of standard deviations	1.70 to 2.32	0.85 to 2.89	0.47 to 0.50	2.26 to 5.31	29.92 to 217.24

[a]Completed 12 or less years of formal education.

[b]Completed more than 12 years of formal education.

[c]Coefficient alpha.

*Observed differences between subgroups significant at .05 level.

**Observed differences between subgroups significant between .10 and .05 levels.

Subgroup 2^b (n_2=117)				
X_1 Socialization	X_4 Scope	X_5 Pervasiveness	X_6 Salience	Role X_8 Performance
.443*	.509*	.925	.783*	.585**
.161	.163	.556	.220	.322
.037 to 3.64	-.004 to .486	.340 to .805	-.091 to .570	-0.96 to .756
.082 to .240	.040 to .222	.466 to .602	.104 to .289	.235 to .444
3.72 to 7.51	1.20 to 8.09	0.51 to 0.73	11.67 to 15.09	70.77 to 542.71
1.45 to 2.23	1.05 to 2.66	0.44 to 0.50	1.89 to 4.94	23.04 to 238.81

"conditional" or dependent to some degree upon the educational background of the local civil defense personnel.

Assessment of composite measures

A summary of the characteristics of the five composite scales is presented in Table 14 in assessing the moderating effects of formal educational backgrounds on the reliability of measurement and other scale analysis criteria under consideration. The complete correlation matrices, corrected item-total correlations, item means and item standard deviations for the socialization, scope, pervasiveness, salience and role performance scales are included in their respective Appendices A, D, E, F and H.

The observed differences between the variance-covariance matrices from which coefficient alpha is estimated are statistically significant at the 5 percent level on the basis of the χ^2 test for the equivalency of the matrices for the composite measures of socialization, scope and salience. The estimates of measurement reliability for the composite socialization and scope scales are significantly larger for the lesser educated subgroup whereas the reliability estimate for the salience scale is significantly greater for the subgroup having completed more than 12 years of formal education. Similar direction of differences between the two subgroups are evidenced for the average inter-item correlations

for the three scales in that the average coefficient is larger in the subgroup with 12 or less years of formal education for the composite measures of socialization and scope with the average inter-item coefficient for the measure of salience being larger in the more highly educated subgroup. The estimate of reliability on the role performance scale is observed to be higher between the 10 and 5 percent levels of significance for the subgroup with more than 12 years of formal education with a similar trend being evident in relation to the average inter-item correlation.

No specific patterns appear to be present between the two educational subgroups in relation to the other scale analysis criteria in that the desired scale properties are more closely approximated for certain of the criteria for particular composite measures in one subgroup than in the other group as indicated in Table 14. Differential patterns of statistically significant inter-item correlation coefficients and the specific items and number of scale items exceeding the minimum item-total criterion for the composite measures of scope, salience and role performance are evidenced as indicated in the corresponding correlation matrices for these variables in the Appendices.

Discussion of composite scale differentials for the educational subgroups On the basis of the above analysis it appears that divergent formal educational achievements of the local civil defense directors does function as a moderator variable in differentiating the total sample with respect to the errors of measurement on the socialization, scope, salience and role performance variables. In addition there is empirical evidence to indicate that the two subgroups can be differentiated with respect to the observed interrelationships between scale items for the composite measures of scope, salience and role performance. In cognizance of these differentials it is suggested that if the appropriate empirical scale adjustments or statistical corrections for measurement error were to be applied a priori to the evaluation of the causal model that further differences or convergencies in the empirical model might be effected between the two subgroups.

In observing that certain of the desired scale properties on particular composite scales are more closely approximated in one educational subgroup than in the other, it appears that no general principles can be posited about the "moderating" effects of formal educational backgrounds on the five composite measures under consideration. It would also appear that the adverse effects of errors of measurement on the causal parameter estimates, R^2 values and tests of

statistical significance may tend to vary as a function of the particular subgroup but also in accordance with the particular variables entering the relationships of concern. For example, the attenuation problem on relationships involving socialization may tend to be greater in the more highly educated subgroup whereas the adverse effects of measurement error on salience may be slightly greater in the subgroup with 12 or less years of formal education.

Subgrouping by Jurisdictional Location

The size of population of the local directors' civil defense jurisdictions is utilized in forming two subgroups in order to evaluate the hypotheses that directors located in rural jurisdictions (2500 or less inhabitants) are to be differentiated from those directors located in urban centers with more than 2500 people with respect to the causal and measurement relationships of concern. It is recognized that size of population is not a perfect indicator of the differentials implied by the rural and urban concepts but it is suggested that the use of these subgroupings is somewhat indicative of: (1) differential access to supervisory contacts and influence relationships; and (2) divergent social and cultural environments which may influence the lower participants orientation toward and performance in the

civil defense organization. Eighty-eight local directors are included in the rural subgroup and 152 in the urban subgroup in evaluating the hypothesized effects of jurisdictional location on the relationships under consideration.

Evaluation of the causal relationships

In assessing the differentiating effects of jurisdictional location on the location of the regression lines for the two subgroups, the data presented in Table 15 indicate that the observed mean values for the local directors in urban centers on all eight variables are significantly greater at the 5 percent level from the mean values evidenced by the rural subgroup.

Differences between the two subgroups are also observed in relation to the degree of association between the variables in the causal model of effectiveness in organizations. As indicated in Table 16 for the rural directors and Table 17 for the urban civil defense personnel the two subgroups tend to be differentiated with respect to the pattern of statistically significant correlations between the eight variables as well as with respect to the number and magnitude of negative correlation coefficients. In forming the basis for causal relationships and in being indicative of the total effect of the causal variables, these differentials in the degree of association between the independent and dependent variables

Table 15. Causal and dependent variable means and standard deviations for jurisdictional location subgroups

Variable	Rural (n_1 = 88)		Urban (n_2 = 152)	
	Mean	Standard Deviation	Mean	Standard Deviation
X_1 Socialization	20.83*	5.29	24.26*	4.64
X_2 Communication	72.96*	30.26	101.52*	18.07
X_3 Selectivity	2.71*	0.74	3.51*	1.38
X_4 Scope	11.89*	4.65	16.14*	3.94
X_5 Pervasiveness	4.74*	3.93	6.41*	3.43
X_6 Salience	206.43*	27.80	220.67*	27.15
X_7 Role tension	11.59*	5.03	13.01*	3.89
X_8 Role performance	1210.20*	488.45	1705.91*	442.81

*Observed mean differences between subgroups significant at .05 level.

are further reflected in the causal parameter estimates and direct and total indirect effects shown in Table 18 and Table 19 respectively.

In comparing the relative importance of causal variables on the basis of the estimated path coefficients within each of the subgroups, there is empirical evidence that socialization (P_{41} = .542) is twice as important as is communication (P_{42} = .268) in accounting for the observed variation on scope for the rural subgroup whereas communication (P_{42} = .365) tends to be relatively more important than is socialization

Table 16. Correlation matrix of causal model variables for rural subgroup (n_1=88)

Variable	Zero-order correlation coefficients							
X_1 Socialization	-							
X_2 Communication	.358**	-						
X_3 Selectivity	.268**	.051	-					
X_4 Scope	.620**	.455**	.174	-				
X_5 Pervasiveness	.243*	.088	.151	.216*				
X_6 Salience	.187	.071	-.084	.265**	.177	-		
X_7 Role tension	.234*	.267**	-.225*	.374**	.032	.224*	-	
X_8 Role performance	.455**	.288**	.112	.428**	.227*	.079	.131	-

*Significant at .05 level.

**Significant at .01 level.

Table 17. Correlation matrix of causal model variables for urban subgroup (n_2=152)

Variable	Zero-order correlation coefficients							
X_1 Socialization	-							
X_2 Communication	.207*	-						
X_3 Selectivity	.193*	.192*	-					
X_4 Scope	.329**	.418**	.221**	-				
X_5 Pervasiveness	.120	.179*	.084	.384**	-			
X_6 Salience	-.021	.133	.173*	.283**	.276**	-		
X_7 Role tension	.093	.001	.060	.296**	.030	.254**		
X_8 Role performance	.188*	.219**	.209**	.473**	.371**	.358**	.248**	-

*Significant at .05 level.

**Significant at .01 level.

Table 18. Partial regression estimates[a] of causal relationships for jurisdictional location subgroups

Dependent and Independent Variables	Rural (n_1=88)				Urban (n_2=152)			
	F Value	Partial Reg. Coef.	Path Coef.	R^2	F Value	Partial Reg. Coef.	Path Coef.	R^2
X_4 SCOPE				.4466				.2363
X_1 Socialization	36.75	0.460	.524		12.02	0.215	.254	
X_2 Communication	9.61	0.041	.268		24.93	0.079	.365	
X_5 PERVASIVENESS				.0591				.1472
X_1 Socialization	5.40	0.181	.243		-	-	-	
X_2 Communication	-	-	-		-	-	-	
X_3 Scope	-	-	-		25.89	0.334	.384	
X_6 SALIENCE				.0703				.1132
X_3 Selectivity	-	-	-		-	-	-	
X_4 Scope	6.50	1.584	.265		6.19	1.433	.208	
X_5 Pervasiveness	-	-	-		5.54	1.557	.197	
X_7 ROLE TENSION				.2279				.1192
X_3 Selectivity	9.58	-2.032	-.299		-	-	-	
X_4 Scope	19.50	0.462	.427		9.22	0.240	.243	
X_5 Pervasiveness	-	-	-		-	-	-	
X_6 Salience	-	-	-		5.35	0.026	.185	
X_8 ROLE PERFORMANCE				.2069				.3049
X_1 Socialization	22.44	41.986	.455		-	-	-	
X_2 Communication	-	-	-		-	-	-	
X_3 Selectivity	-	-	-		-	-	-	
X_4 Scope	-	-	-		20.62	38.680	.344	
X_5 Pervasiveness	-	-	-		5.74	23.372	.181	
X_6 Salience	-	-	-		8.34	3.427	.210	
X_7 Role tension	-	-	-		-	-	-	

[a]Regression coefficients statistically significant at .05 level only included.

Table 19. Direct and total indirect effects (TIE) of causal variables[a] on dependent variables[b] for jurisdictional location subgroups

Dependent and Independent Variables	Rural (n_1=88)		Urban (n_2=152)	
	Direct Effect	Total Indirect Effects	Direct Effect	Total Indirect Effects
X_4 SCOPE				
X_1 Socialization	.524	.096	.254	.075
X_2 Communication	.268	.187	.365	.053
X_6 SALIENCE				
X_4 Scope	-	-	.208	.075
X_5 Pervasiveness	-	-	.197	.079
X_7 ROLE TENSION				
X_3 Selectivity	-.299	.074	-	-
X_4 Scope	.427	-.052	.243	.053
X_5 Pervasiveness	-	-	-	-
X_6 Salience	-	-	.185	.069
X_8 ROLE PERFORMANCE				
X_4 Scope	-	-	.344	.129
X_5 Pervasiveness	-	-	.181	.190
X_6 Salience	-	-	.210	.148

[a]Includes only independent variables significantly related to the dependent variable(s).

[b]Indirect effects computed only on dependent variables for which multiple paths are involved.

(P_{41} = .254) in explaining the variation observed on scope for the local directors from urban jurisdictions. It is also to be noted that for the civil defense personnel from rural areas that socialization is the only variable for which statistically significant causal relationships are evidenced with pervasiveness and role performance, and also that a

statistically significant inverse relationship between selectivity and role tension is indicated for the rural subgroup. In comparison three variables - scope, pervasiveness and salience - are significantly related to role performance for the urban directors with scope being the only causal variable with a statistically significant relationship with pervasiveness for the urban subgroup.

Scope, for which path values of .265 and .427 are observed on its relationships with salience and role tension respectively, appears to be relatively more important in effecting changes in organizational salience and role tension within the rural subgroup in comparison to the effects of scope on salience and role tension for the urban directors for whom comparable path values of .208 and .243 are observed in the empirical estimates. Similar trends respecting the relative importance of causal variables are observed by comparing unstandardized partial regression estimates between the two jurisdictional subgroups.

Other differences between the two subgroups are also present on the other dependent variables in the model which are further illustrated in the path diagrams presented in Figure 5 and Figure 6 for the rural and urban subgroups respectively and in Table 19 showing the direct and total indirect effects of the independent variables on each of the dependent variables for which multiple causal paths are in-

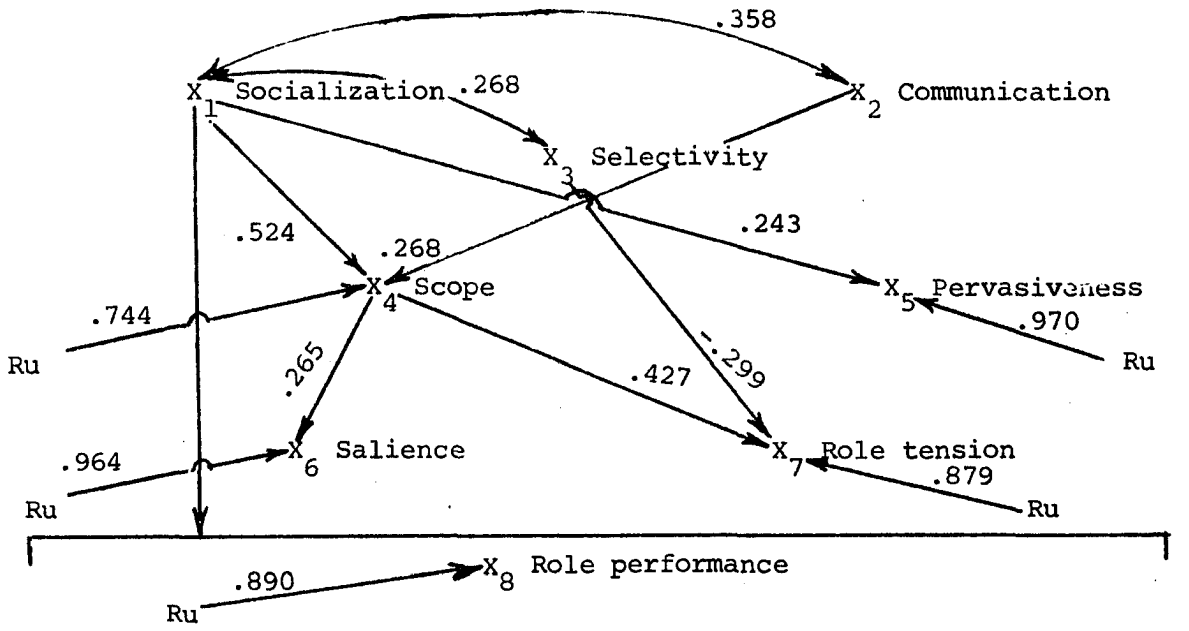

Figure 5. Empirically evaluated causal model of effectiveness in organizations for rural subgroup (n_1=88)

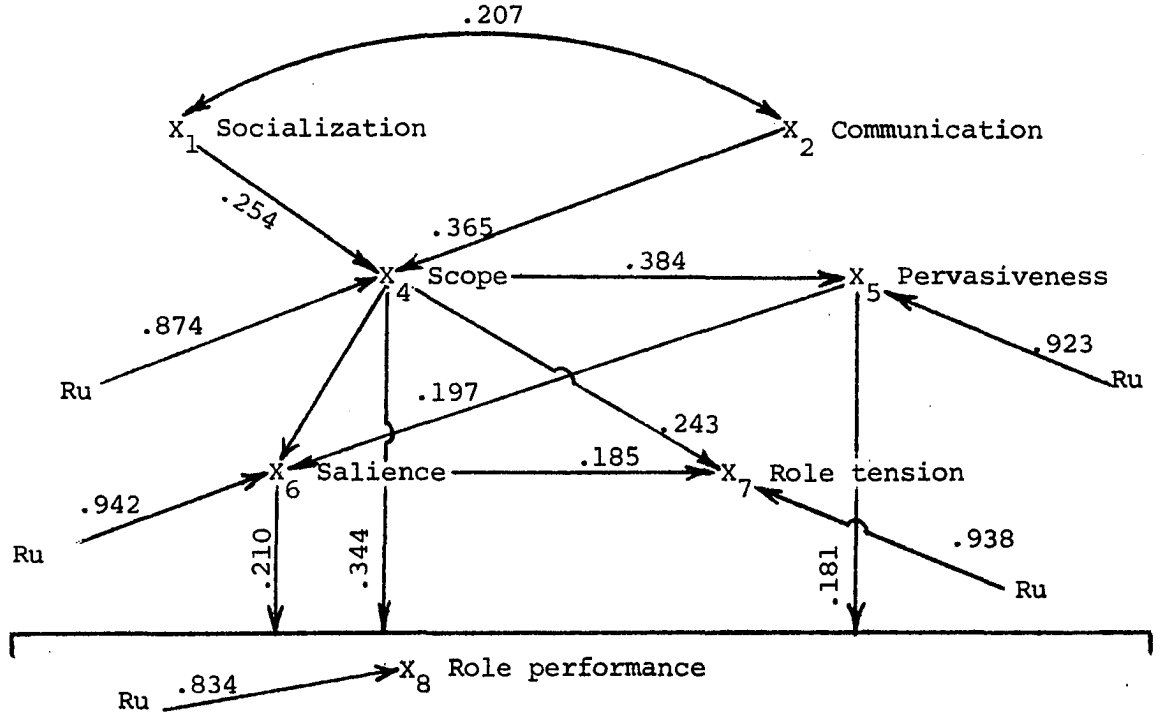

Figure 6. Empirically evaluated causal model of effectiveness in organizations for urban subgroups (n_2=152)

volved. Of interest in Table 19 is the negative indirect effect of scope on role tension for the rural subgroup due to the inverse relationship between selectivity and role tension.

On the basis of the confidence intervals computed for each of the multiple correlation coefficients, there is empirical evidence as indicated in Table 20 that a significantly greater proportion of the observed variation on scope ($R_4 \cdot$) is accounted for by the socialization and communication processes for the rural directors than is accounted for by the same two causal variables in the urban subgroup. The observed differentials between the two subgroups in the degree of explained variation on the other dependent variables do not tend to be statistically significant at the 5 percent level.

Rural-urban effects on organizational processes and relationships The evidence presented in empirically evaluating the causal model of organizational effectiveness tends to support the hypothesis that jurisdictional location will function as a moderator variable in differentiating local civil defense directors located in rural areas from those located in urban centers with respect to the causal efficacy of the organizational processes in producing desired levels of normative commitment to and effective role per-

Table 20. Ninety-five percent confidence intervals for multiple correlation coefficients[a] for jurisdictional location subgroups

Multiple Correlation Coefficient	Rural (n_1=88)			Urban (n_2=152)		
	Value	Lower Limit	Upper Limit	Value	Lower Limit	Upper Limit
$R_{4.}$	.6683	.54	.77	.4858	.34	.59
$R_{5.}$	.2431	.03	.43	.3837	.24	.51
$R_{6.}$	.2651	.08	.45	.3364	.19	.47
$R_{7.}$	.4774	.30	.63	.3452	.19	.47
$R_{8.}$	.4549	.26	.61	.5522	.43	.65

[a]Multiple correlation estimates based on independent variables whose parameter estimates are significant at .05 level.

formance in the civil defense organization. In particular job orientation appears to be more causally important relative to the recruitment and communication processes in effecting the degree of organizational scope, pervasiveness and role performance exhibited by the directors located in rural civil defense jurisdictions. On the other hand, communication tends to be relatively more important for the urban subgroup in accounting for the observed variation on organizational scope. The effect of organizational scope on subsequent organizational variables (pervasiveness, salience, role tension and role performance) also appears to vary in relation

to the location of the local civil defense directors in that: (1) the degree to which the local personnel become jointly involved in organizational activities is relatively more efficacious in "producing" changes on the amount of pervasiveness and organizational effectiveness for urban directors; whereas (2) relatively more important effects of organizational scope on salience and role tension are observed for the local participants in rural environments. The amount of selectivity practiced in recruiting local personnel for rural civil defense positions appears to be negatively related to the amount of role tension exhibited by the local civil defense directors. This latter observation tends to suggest that: (1) under conditions of low recruitment selectivity based on fortuitous circumstances or the mere availability of people to fill rural positions may result in high levels of role tension: and that (2) initial "job orientation" may have to be more effective in rural areas to offset any possible adverse effects of high role tension resulting from "low" recruitment selectivity. This interpretation is suggested as being consistent with the observed relative importance of socialization for the rural subgroup and also appears to be supportive of Etzioni's (1961) hypothesis respecting the substitutability of socialization and recruitment selectivity in "producing" desired levels of organizational effectiveness.

The relative importance of communications for urban personnel in directly effecting organizational scope and in indirectly "producing" changes on pervasiveness, salience, role tension and role performance may tend to be suggestive of differential access to supervisory staff available to the local civil defense directors located in urban centers.

The causal model as empirically reformulated for the urban subgroup tends to more closely approximate and lend support to the original theoretical model formulated by Mulford et al. (1972a). However, a more parsimonious model which accounts for a statistically equivalent or greater proportion of the observed variation on the dependent variables is evidenced for the local civil defense personnel located in rural civil defense jurisdictions. It is necessary to recognize, however, that the urban subgroup are observed to have significantly higher scores on all independent and dependent variables in comparison to the rural subgroup. In tending to stress the differentials between the two subgroups it is also to be noted that certain similarities are obtained under conditions suggestive of divergent social and cultural environments and differential availability of resources in effecting organizational expectations. In ignoring the relative intensities of the estimated causal parameters, it is observed that statistically significant estimates are

evidenced for the relationships between: (1) socialization and scope; (2) communication and scope; and (3) scope and role tension for both the rural and urban local civil defense directors. These results are generally supportive of the theoretical relevance of the concepts of socialization, communication and scope to organizational effectiveness under diverse environmental conditions.

In summary there appears to be empirical support for the hypothesized moderator effects of jurisdictional location in differentiating the rural subgroup from local directors in urban centers with respect to the causal model of effectiveness in organizations. A complex interaction between the participants' organizational location and the causal relationships of concern appears to be involved whereby different causal variables have differential efficacy in relation to the significantly different observed variable scores between the urban and rural subgroups. It is, therefore, suggested that jurisdictional location in operating as a moderator variable tends to differentiate the urban and rural subgroups with respect to the location as well as the "parallelism" of the regression lines under consideration.

Assessment of composite measures

A summary of the observed characteristics for the five composite scales is presented in Table 21 and as indicated the observed differences between the estimates of measurement

reliability for the two jurisdictional location subgroups are statistically significant at the .05 level for all five scales, as determined by the χ^2 test for the equivalency of the covariance matrices. The reliability estimates for the rural subgroup on the socialization and pervasiveness scales are significantly greater than the comparable estimates for the urban directors whereas the urban subgroup evidences significantly lesser errors of measurement on the scope, salience and role performance scales in comparison to the local directors situated in rural areas.

With minor exceptions, the observed differentials between the two groups on other scale analysis properties tend to be in general agreement with the differences on the measurement reliability estimates for the five composite measures. As indicated in Table 21, the rural subgroup which has significantly higher estimates of reliability on the socialization and pervasiveness scales also tend to evidence higher average inter-item correlations, smaller ranges of inter-item correlations and smaller ranges containing 60 percent of the inter-item correlations on these two scales. In addition, all inter-item correlations observed on the socialization measure for the rural subgroup are greater than zero. It is, therefore, suggested that the composite measures of socialization and pervasiveness for the rural subgroup tend to exhibit greater degrees of linearity and homogeneity of

Table 21. Characteristics of composite measurement scales for jurisdictional location subgroups

Criteria	Composite Scale: Rural (n_1=88)				
	X_1 Socialization	X_4 Scope	X_5 Pervasiveness	X_6 Salience	X_8 Role Performance
Coefficient of reliability[a]	.559*	.466*	.933*	.744*	.480*
Average inter-item correlation	.250	.157	.582	.177	.278
Range of inter-item correlations	.07 to .34	-.04 to .49	.34 to .82	-.13 to .60	-.11 to .65
Range containing 60% of inter-item correlations	.23 to .34	.04 to .33	.51 to .68	.04 to .28	-.03 to .40
Range of means	3.54 to 6.41	0.60 to 6.52	0.40 to 0.58	10.57 to 15.01	26.68 to 568.99
Range of standard deviations	1.40 to 2.38	0.86 to 3.05	0.49 to 0.50	1.99 to 4.87	31.73 to 247.23

[a]Coefficient alpha.

*Observed differences between subgroups significant at .05 level.

Urban (n_2=152)				
X_1 Socialization	X_4 Scope	X_5 Pervasiveness	X_6 Salience	X_8 Role Performance
.414*	.503*	.901*	.752*	.507*
.145	.167	.484	.185	.248
-.05 to .30	-.07 to .37	.29 to .72	-.08 to .65	-.09 to .71
.17 to .30	.19 to .33	.40 to .59	.12 to .33	.12 to .37
3.85 to 7.70	1.26 to 9.06	0.42 to 0.78	11.45 to 15.23	75.10 to 557.56
1.67 to 2.28	0.93 to 2.11	0.42 to 0.50	2.14 to 5.28	17.53 to 217.31

items in comparison to the directors located in urban civil defense areas. Similar trends are to be noted for the urban subgroup on the composite measures of scope and salience for which significantly higher estimates of measurement reliability are associated with larger average inter-item correlations and smaller ranges containing a majority of or the totality of inter-item correlation coefficients. The significantly higher estimate of reliability on the role performance scale for the urban subgroup is, however, not accompanied by a larger average inter-item correlation or the absence of negative correlational elements. The presence of negative inter-item correlations on the salience scale is also evidenced by both the rural and urban local civil defense directors.

Other differentials between the two jurisdictional subgroups are also observed in the complete correlation matrices included in the respective Appendices for the five composite measures in relation to: (1) divergent patterns and magnitudes of statistically significant inter-item correlations on the socialization, scope, salience and role performance scales; and (2) different items and number of items exceeding the minimum item-total criterion for the composite measures on salience and role performance whereas all items in the measure of pervasiveness and none of the items on the socialization scale exceeded the criterion in either of the subgroups.

Rural-urban effects on the measurement of sociological variables On the basis of the empirical evidence cited above there tends to be support for the hypothesis that divergent jurisdictional locations (rural and urban) will differentiate the local civil defense directors with respect to the efficacy of measurement of substantive variables. In observing that the reliability of measurement varies in relation to the particular variable under consideration as well as in relation to the subgroup for which the variable is observed, it is suggested that certain variable relationships and related R^2 values will tend to be more attenuated in one group than in the other. In addition there appears to be empirical evidence to support the suggestion that the robustness of statistical tests will vary as a function of the particular variable(s) and subgroup under consideration.

On the basis of the empirical evidence cited above whereby the desired scale analysis properties tend to be more closely approximated on the measurement of particular variables in one locational subgroup than in the other, it does not appear to be possible to state any general principles about the direction of the differentiating effects of jurisdictional location on the measurement of social science variables. That is, there is no empirical evidence to suggest that local civil defense directors located in urban centers, for example, will exhibit more or less measurement error con-

sistently across the five substantive variables under consideration. However, the evidence does indicate, in support of the hypothesized relationship, that the jurisdictional location of the local civil defense personnel has "moderating" effect on the measurement of the variables under consideration in differentiating rural and urban directors with respect to desired scale analysis criteria. It is, therefore, suggested that the utilization of statistical procedures which incorporate measurement reliability estimates and the empirical adjustment of composite scales on the basis of scale analysis properties may be more effectively applied to the observed values and estimates within the subgroups rather than to the "average" values observed for the total research sample.

Subgrouping by Time and Pay Status

Two subgroups are formed in evaluating the hypotheses that the time and salary status of the local civil defense directors will function as a moderator variable in differentiating the total research sample with respect to the substantive relationships and measurement procedures under consideration. The dichotomization of total sample into subgroups of 169 part-time and 71 full-time local civil defense directors is based primarily on the differential time and energies available to the local personnel in carrying out

their respective role commitments.

Evaluation of the causal relationships

The full-time civil defense directors are to be differentiated from the part-time personnel with respect to the regression line intercepts as indicated in Table 22 where the observed mean value differences on seven of the causal model variables are statistically significant at the 5 percent level. Selectivity is the only variable in the causal model of effectiveness in organizations for which the full-time directors do not evidence a significantly higher mean value.

Table 22. Causal and dependent variable means and standard deviations for time-pay status subgroups

Variable	Part-time (n_1=169)		Full-time (n_2=71)	
	Mean	Standard Deviation	Mean	Standard Deviation
X_1 Socialization	22.22*	5.26	24.84*	4.40
X_2 Communication	88.10*	27.74	98.07*	23.97
X_3 Selectivity	3.11	1.12	3.48	1.48
X_4 Scope	13.81*	4.52	16.41*	4.56
X_5 Pervasiveness	5.35*	3.82	6.86*	3.20
X_6 Salience	212.77*	27.51	221.83*	28.94
X_7 Role tension	11.82*	4.63	14.08*	3.24
X_8 Role performance	1463.37*	485.26	1668.84*	565.55

*Observed mean differences between subgroups significant at .05 level.

In assessing the degree of association between the eight variables as estimated by zero-order correlation coefficients, the empirical evidence presented in Tables 23, 24 and 25 tends to suggest that the two subgroups are differentiable in relation to the statistically significant variable relationships observed for the two types of local civil defense directors. The empirical evidence shown in Table 23 and Table 24 for the part-time and full-time directors respectively indicated that minor differences exist with respect to the number of statistically significant correlation coefficients but that important differences exist in relation to the patterning of the significant inter-variable correlations. The theoretical and statistical significance of these differentials is further evidenced by the partial regression coefficient estimates, presented in Table 25 and in diagrammatic form in the empirically evaluated causal models presented in Figures 7 and 8.

In assessing the relative importance of causal variables between subgroups on the basis of unstandardized partial regression estimates or within the two groups on the basis of standardized path coefficients, the estimates in Table 25 tend to indicate that socialization (P_{41} = .428) in comparison to communication (P_{42} = .336) has greater causal efficacy in explaining the observed variation on scope for the part-time personnel. Socialization is also observed to have a

Table 23. Correlation matrix of causal model variables for part-time subgroup (n_1=169)

Variable	Zero-order correlation coefficients						
X_1 Socialization	-						
X_2 Communication	.362**	-					
X_3 Selectivity	.324**	.203*	-				
X_4 Scope	.550**	.491**	.286**	-			
X_5 Pervasiveness	.224**	.200*	.200*	.358**	-		
X_6 Salience	.147	.155	.066	.315**	.257**	-	
X_7 Role tension	.137	.125	-.067	.347**	-.004	.281**	-
X_8 Role performance	.395**	.353**	.258**	.515**	.395**	.298**	.157 -

*Significant at .05 level.
**Significant at .01 level.

Table 24. Correlation matrix of causal model variables for full-time subgroup (n_2=71)

Variable	Zero-order correlation coefficients						
X_1 Socialization	-						
X_2 Communication	.392**	-					
X_3 Selectivity	.134	.337**	-				
X_4 Scope	.363**	.678**	.273**	-			
X_5 Pervasiveness	.100	.175	.002	.283*	-		
X_6 Salience	-.006	.275*	.315**	.342**	.259*	-	
X_7 Role tension	.212	.362**	.161	.258*	.122	.132	
X_8 Role performance	.338**	.551**	.295**	.608**	.245*	.326**	.382** -

*Significant at .05 level.
**Significant at .01 level.

Table 25. Partial regression estimates[a] of causal relationships for time-pay status subgroups

Dependent and Independent Variables	Part-time (n_1=169)				Full-time (n_2=71)			
	F Value	Partial Reg. Coef.	Path Coef.	R^2	F Value	Partial Reg. Coef.	Path Coef.	R^2
X_4 SCOPE				.4005				.4600
X_1 Socialization	44.13	0.368	.428		-	-	-	
X_2 Communication	27.20	0.055	.336		58.77	0.129	.678	
X_5 PERVASIVENESS				.1281				.0800
X_1 Socialization	-	-	-		-	-	-	
X_2 Communication	-	-	-		-	-	-	
X_4 Scope	24.54	0.302	.358		6.00	0.199	.283	
X_6 SALIENCE				.1232				.1703
X_3 Selectivity	-	-	-		4.34	4.674	.239	
X_4 Scope	10.81	1.556	.256		5.82	1.760	.277	
X_5 Pervasiveness	4.52	1.193	.165		-	-	-	
X_7 ROLE TENSION				.2046				.0667
X_3 Selectivity	4.69	-0.657	-.158		-	-	-	
X_4 Scope	23.56	0.394	.358		4.93	0.183	.258	
X_5 Pervasiveness	4.70	-0.200	-.165		-	-	-	
X_6 Salience	8.14	0.036	.212		-	-	-	
X_8 ROLE PERFORMANCE				.3450				.4241
X_1 Socialization	3.94	13.948	.151		-	-	-	
X_2 Communication	-	-	-		-	-	-	
X_3 Selectivity	-	-	-		-	-	-	
X_4 Scope	19.09	37.272	.347		32.87	67.788	.546	
X_5 Pervasiveness	12.04	30.081	.236		-	-	-	
X_6 Salience	-	-	-		-	-	-	
X_7 Role tension	-	-	-		6.38	42.055	.241	

[a]Regression coefficients statistically significant at .05 level only included.

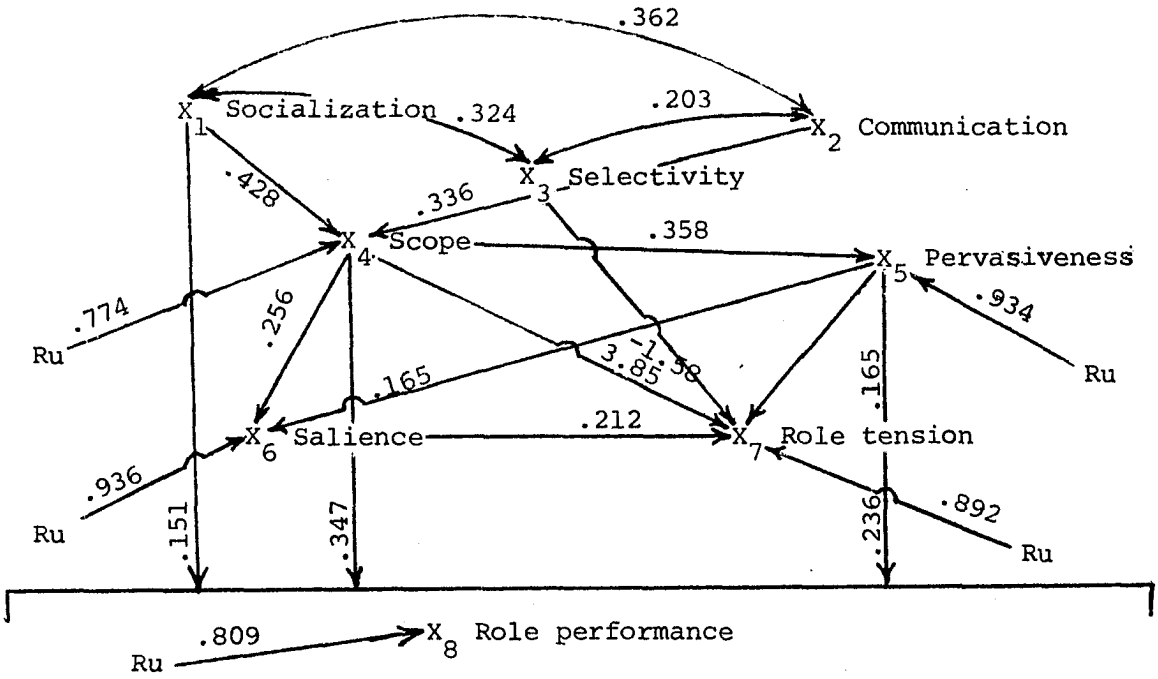

Figure 7. Empirically evaluated causal model of effectiveness in organizations for part-time subgroup (n_1=169)

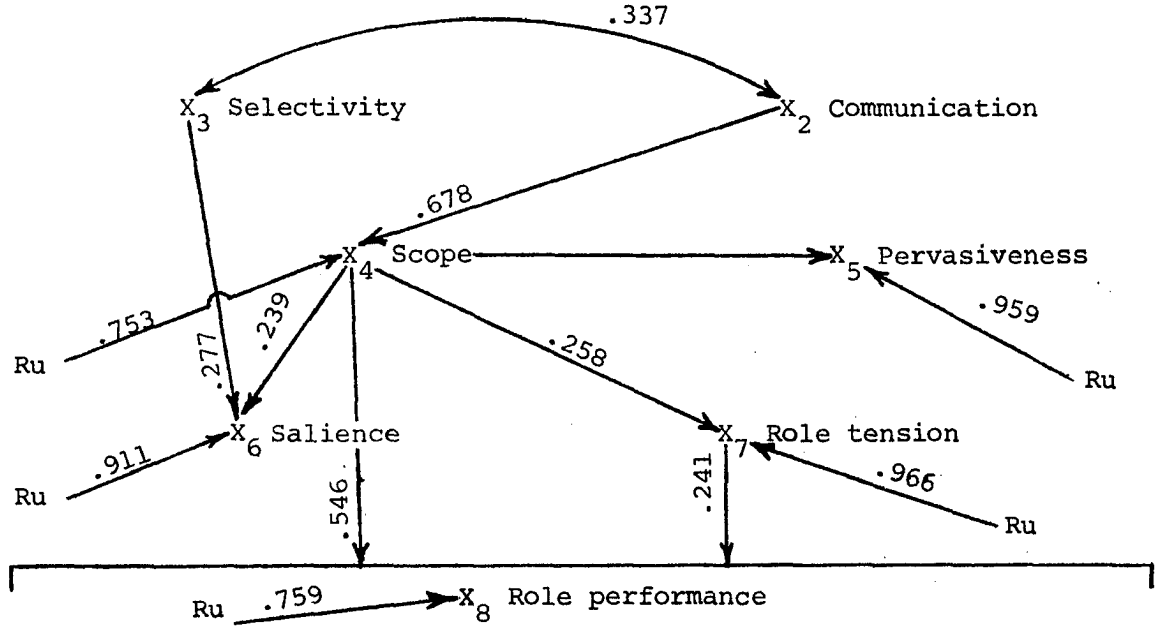

Figure 8. Empirically evaluated causal model of effectiveness in organizations for full-time subgroups (n_2=71)

statistically significant relationship with role performance for the part-time local civil defense directors. In comparison, all of the explained variation observed on organizational scope for the full-time directors is referred to communication, but communication has only indirect effects through scope on all subsequent organizational variables. Divergent trends are evidenced by the parameter estimates on causal relationships involving selectivity in that a positive relationship between selectivity and salience is observed for the full-time directors whereas a negative relationship is evidenced between selectivity and role tension for the part-time personnel. A negative parameter estimate of the relationship between pervasiveness and role tension is also observed for the part-time subgroup.

Of significance in the full-time subgroup is that scope is the only causal variable for which statistically significant relationships are observed with pervasiveness and role tension and in addition is over twice as important as role tension in accounting for the observed variation on role performance. A further indication of the differential relative importance of causal variables between the two subgroups is presented in Table 26 showing the direct and total indirect effects of "competing" causal variables in accounting for the observed variation on the dependent variables. As indicated in Table 26 and in the two path diagrams in Figures

Table 26. Direct and total indirect effects of causal variables[a] on dependent variables[b] for time-pay status subgroups

Dependent and Independent Variables	Part-time (n_1=169)		Full-time (n_2=71)	
	Direct Effect	Total Indirect Effects	Direct Effects	Total Indirect Effects
X_4 SCOPE				
X_1 Socialization	.428	.122	-	-
X_2 Communication	.336	.155	-	-
X_6 SALIENCE				
X_3 Selectivity	-	-	.239	.096
X_4 Scope	.256	.059	.277	.065
X_5 Pervasiveness	.165	.092	-	-
X_7 ROLE TENSION				
X_3 Selectivity	-.158	.091	-	-
X_4 Scope	.385	-.038	-	-
X_5 Pervasiveness	-.165	.121	-	-
X_6 Salience	.212	.069	-	-
X_8 ROLE PERFORMANCE				
X_1 Socialization	.151	.244	-	-
X_4 Scope	.347	.168	.546	.062
X_5 Pervasiveness	.236	.159	-	-
X_7 Role tension	-	-	.241	.141

[a]Includes only independent variables significantly related to the dependent variables.

[b]Indirect effects computed only on dependent variables for which multiple paths are involved.

7 and 8, statistically significant multiple paths are observed for two dependent variables in the full-time group whereas four of the dependent variables in the part-time subgroup are involved in statistically significant multiple relationships with "competing" independent variables. A

Table 27. Ninety-five percent confidence intervals for multiple correlation coefficients[a] for time-pay status subgroups

Multiple Correlation Coefficient	Part-time (n_1=169)			Full-time (n_2=71)		
	Value	Lower Limit	Upper Limit	Value	Lower Limit	Upper Limit
$R_{4.}$	.6328	.53	.71	.6782	.53	.79
$R_{5.}$	.3579	.22	.49	.2828	.05	.48
$R_{6.}$	.3508	.21	.48	.4123	.20	.58
$R_{7.}$	.4523	.32	.56	.2582	.03	.46
$R_{8.}$	.5874	.48	.68	.6512	.48	.76

[a]Multiple correlation estimates based on independent variables whose parameter estimates are significant at .05 level.

negative total indirect effect is noted for scope on role tension due to the inverse relationships between role tension and selectivity and pervasiveness.

The confidence intervals computed for each of the multiple correlation coefficients in order to assess whether the observed differentials between the two subgroups are significantly different or could have occurred on the basis of chance factors are presented in Table 27. As indicated, the differences in the proportion of observed variation on the five dependent variables accounted for by the differential causal equations for the part-time and full-time directors are not statistically significant at the .05 level.

Time and pay status effects on organizational effectiveness The above cited empirical evidence tends to support the hypothesis that divergent causal processes underly the organizational performance of lower participants differentiated according to their time and pay status within the organization. The relative importance of organizational processes in "producing" or accounting for changes in the normative commitment to and performance in the organization is also suggested as being conditional or dependent upon the "status" of the individual within the organization. In particular, the evidence tends to indicate that the initial "job orientation" received by part-time civil defense directors has a direct impact on the degree to which they tend to "manifest" organizational scope and indirectly on the extent to which organizational norms influence the part-time personnels' behavior outside the civil defense organization. The initial socialization received by the part-time directors also has direct effects and indirect effects through scope and pervasiveness on the level of effectiveness evidenced by the part-time personnel. In comparison, communication is observed to be the only organizational process influencing the degree to which the full-time directors become jointly involved in organizational activities but the amount of communication effected is only indirectly related to other organizational variables and to role performance through the amount of scope

manifested by the full-time personnel.

The significant positive relationship between selectivity and organizational salience evidenced by the full-time directors may be interpreted to indicate that the full-time personnel tend to be more "positively" selected or recruited to their civil defense positions and may also be interpreted as being indicative of the hypothesized substitutability (Etzioni, 1961) between selectivity and socialization in view of the failure of socialization to evidence significant relationships with other organizational variables for the full-time subgroup. On the other hand, the negative relationship observed for the part-time personnel may indicate that mere availability of people to fill the civil defense positions may result in high levels of role tension and that socialization efforts may have to be more intense to insure the requisite orientations and goal commitments on the part of part-time personnel.

The causal model of effectiveness in organizations as empirically evaluated for the part-time subgroup appears to more closely approximate the original hypothesized relationships but a more parsimonious model involving six statistically significant relationships is evidenced for the full-time civil defense personnel who are also observed to have higher mean scores on seven of the organizational variables. In comparison 11 relationships which account for a statistically equivalent

proportion of the observed variation on the dependent variables are involved for the part-time organizational participants. To be noted, however, is that organizational scope, as effected by either socialization or communication or both, is significantly related to salience, role tension and role performance for both the part-time and full-time civil defense personnel. These results provide general support for the central role of scope on the effectiveness of normative organizations irrespective of the lower participants' "status" within the organization.

In summary it is suggested that a complex interaction appears to be involved in differentiating the research sample on the basis of the participants' time and pay status in relation to the location of the regression lines as well as the magnitude of the partial regression estimates. The empirical evidence cited also tends to support the hypothesis that the time and pay status of the local civil defense directors will function as a moderator variable in relation to the causal model of effectiveness in organizations.

Assessment of composite measures

The complete correlation matrices, corrected item-total correlation, item means and item standard deviations for the five composite scales - socialization, scope, pervasiveness, salience and role performance - for the two time and pay

status subgroups are included in the respective Appendices for these variables. A summary of the scale analysis properties on the five composite measures for the two groups is presented in Table 28 and as indicated the two groups evidence differential measurement reliability estimates and average inter-item correlations on the socialization, salience and role performance composite measure. As shown the reliability estimates for the full-time group on salience and role performance are significantly larger at the 5 percent level than comparable estimates for the part-time subgroup. Larger average inter-item correlations are also evidenced by the full-time subgroup on the salience and role performance scales but the empirical results in relations to other desired scale analysis properties are not necessarily consistent with the differences observed for the estimates of reliability and average inter-item correlations.

A somewhat surprising result in view of the sizable arithmetic difference observed between the two subgroups on the socialization scales is that the difference is only statistically significant between the .10 and .05 levels. This result focuses attention on the much larger question of measurement reliability estimates and in particular on coefficient alpha being utilized in this study as well as on the test being used to statistically evaluate the observed differences between the estimates of measurement reliability. As indicated

Table 28. Characteristics of composite measurement scales for time-pay status subgroups

Composite Scale	Part-time (n_1=169)				
	X_1	X_4	X_5	X_6	X_8
Criteria	Socialization	Scope	Pervasiveness	Salience	Performance
Coefficient of reliability[a]	.563**	.493	.926	.744*	.519*
Average inter-item correlation	.249	.168	.556	.184	.277
Range of inter-item correlation	.13 to .43	-.03 to .45	.35 to .76	-.09 to .45	-.15 to .66
Range containing 60% of inter-item correlation	.17 to .28	.07 to .22	.46 to .64	.08 to .34	.02 to .44
Range of means	3.66 to 7.01	0.92 to 7.65	0.38 to 0.65	10.80 to 14.96	57.48 to 574.04
Range of standard deviations	1.48 to 2.31	1.03 to 2.74	0.48 to 0.50	2.30 to 5.26	28.18 to 217.92

[a]Coefficient alpha.

*Observed differences between subgroups significant at .05 level.

**Observed differences between subgroups significant between .10 and .05 levels.

Full-time (n_2=71)				
X_1 Socialization	X_4 Scope	X_5 Pervasiveness	X_6 Salience	X_8 Performance
.229**	.585	.885	.795*	.640*
.067	.215	.450	.194	.344
-.30 to .27	-.02 to .56	.14 to .76	-.09 to .64	.09 to .80
-.09 to .18	.03 to .35	.31 to .58	.06 to .37	.20 to .45
3.93 to 7.73	1.26 to 9.27	0.47 to 0.83	11.93 to 15.59	73.82 to 532.49
1.79 to 2.16	0.88 to 2.53	0.37 to 0.50	1.36 to 5.42	22.70 to 250.48

previously a great deal of confusion is evident in the literature in relation to the most appropriate reliability estimate and also as to the meanings to be attached to the particular estimates. Guttman (1945: 257-274), in arguing that items do not replace trials and that reliability coefficients cannot in general be estimated from a single trial, indicates that coefficient alpha is an appropriate estimate only if the item variances and covariances are all equal. Although the variance terms on the four item socialization scale for the full-time subgroup are approximately equal as shown in Table 42 of the Appendices, two of the correlations and, thus, the covariances are negative with one of the negative correlations being statistically significant at the .01 level. In such situations where the covariances are heterogenous and where some are negative, Guttman (1945: 274-275) indicates that coefficient alpha is definitely inferior to other estimates which he proposes. In recognition of this problem in relation to the more general question of measurement reliability estimates it is suggested that this matter be a subject of further empirical investigation.

The statistical procedure being used as proposed by Winer (1971: 594-599) in testing for the equivalency of covariances matrices and thus, coefficient alpha does not appear to make allowances for negative covariance terms or to discuss problems encountered when negative covariances are

present. In addition it is recognized that coefficient alpha is based on covariances only whereas the χ^2 test for the equivalency of the matrices is based on variances as well as covariance terms. In recognition of these problems and differences, the particular test is used due to the unavailability of other statistical tests with known sampling distributions in evaluating the statistical significance of differences observed on estimates of reliability for separate samples or sub-populations.

In accepting the present results on their face value until further empirical research can be initiated, the empirical evidence tends to indicate that the two subgroups can be differentiated in relation to the errors of measurement and other scale analysis properties on the composite measure of socialization. As indicated above the estimate of reliability on the socialization scale is larger for the part-time personnel and is significantly different between the .10 and .05 levels than the comparable estimate for the full-time subgroup. In addition it is observed that a larger average-item correlation, a smaller range of inter-item correlations and a smaller range containing a majority (60%) of the inter-item correlations is evidenced by the part-time civil defense personnel.

The inter-item correlations on the socialization scale are all greater than zero for the part-time subgroup with a similar observation being evident on the composite measure of role

performance for the full-time personnel. To be noted is the presence of statistically nonsignificant inter-item correlations on the pervasiveness scale for the full-time civil defense directors as shown in Table 61 in the Appendices which is not evidenced by any other subgroup nor by the total research sample.

Further differentials between the two subgroups are also observed in the complete correlation matrices in the Appendices for the socialization, scope, salience and role performance scales with respect to the pattern of statistically significant inter-item correlation coefficients. Differences are also indicated on the scope, salience and role performance scales in relation to the particular and number of items which exceed the minimum item-total criterion.

Effects of divergent time and pay statuses on sociological measurement procedures On the basis of the empirical data presented above, there tends to be evidence that part-time and full-time civil defense directors can be differentiated in relation to errors of measurement in operationalizing the concepts of socialization, salience and role performance. No clear cut trends are evident between the two time-pay status subgroups in that one subgroup does not tend to exhibit higher or lower estimates of reliability consistently across all the composite scales under consideration. A similar observation

is to be noted with respect to the degree to which the other desired scale analysis properties are approximated on particular variables in one subgroup in comparison to the other. As a result it is suggested that the degree of problems created by random errors of measurement in "obscuring" theoretical relationships and in affecting the power of statistical tests will vary in relation to the substantive variable(s) under consideration but also in accordance with the "type" of individuals for whom the relationships are being analyzed.

On the basis of the above observation it is meaningful to consider whether the evidence of statistically non-significant causal parameters estimates on the socialization variable for the full-time personnel is indicative of the "true" underlying relationships or is a result of the sizable errors of measurement evidenced on the empirical measure of socialization for the full-time subgroup.

The empirical evidence presented tends to support the observations made by previous researchers and the dissertative hypotheses that research population subgroups can be differentiated with respect to the errors of measurement and other scale analysis properties in the measurement of social science variables. The data cited above also tend to support the specific hypothesis that time and pay status of local civil defense directors will function as a moderator variable in differentiating part-time and full-time personnel in relation

to reliability of measurement and other desired scale properties.

Typological Subgrouping

In order to assess the joint effects of the three moderator variables taken together, a typological reduction of the three dimensional attribute space formed by cross-classifying the individual moderator variables is effected in deriving two "typological" subgroups. The "reconstruction" of the local civil defense director on the basis of the three attributes of concern was deemed to be necessary in recognizing that: (1) social scientists are more concerned with "whole" individuals rather than disparate attributes of the individual; and (2) the analysis of the "moderating"effects of separate attributes is likely to be confounded by the influence of other characteristics of the individuals on the relationships under consideration. The utilization of the typological reduction in order to simultaneously evaluate the effects of the three individual "moderators" on the causal and measurement relationships under consideration also averted the problem of declining N in considering the 2^3 possible combinations of the three attributes.

In developing the two typological subgroups it is suggested that divergent jurisdictional location, time and pay statuses and educational attainments are somewhat indicative

of the differentials implied by the localite-cosmopolite concepts. The localite subgroup, thus, formed included 132 individuals who are characterized by two or more of the following attributes: rural jurisdictional location, 12 or less years of formal education and a part-time pay status. In comparison the cosmopolite subgroup included 108 local directors who are possessant of at least two of the following attributes: more than 12 years of formal education, a full-time pay status and located in an urban civil defense area.

Evaluation of the causal relationships

The two subgroups are to be differentiated with respect to the location of the regression lines of concern as indicated in Table 29 which shows that the cosmopolite subgroup is observed to have significantly higher mean scores on 6 of the variables in the causal model. The cosmopolite subgroup is also observed to have higher mean scores on pervasiveness and role tension but the differences are not statistically significant at the .05 level for these two variables.

Differences between the two subgroups are also to be observed in relation to the degree of association between the eight variables as shown in Table 30 and Table 31 for the localite and cosmopolite groups respectively. An equal number of statistically significant correlation coefficients are evidenced by the two subgroups but the pattern of

Table 29. Causal and dependent variable means and standard deviations for localite-cosmopolite subgroups

Variable	Localite (n_1=132)		Cosmopolite (n_2=108)	
		Standard Deviation		Standard Deviation
X_1 Socialization	21.73*	5.33	24.55*	4.48
X_2 Communication	83.07*	28.94	100.80*	20.76
X_3 Selectivity	3.04*	0.99	3.43*	1.47
X_4 Scope	13.43*	4.61	15.99*	4.38
X_5 Pervasiveness	5.08*	3.72	6.67*	3.50
X_6 Salience	209.91*	27.52	222.22*	27.62
X_7 Role tension	12.01	4.62	13.07	4.02
X_8 Role performance	1390.89*	492.25	1687.03*	503.34

*Observed mean differences between subgroups significant at .05 level.

statistically significant coefficients and magnitude of comparable correlations are observed to vary between the localite and cosmopolite personnel. In being indicative of the total effect of causal variables and in being one of the major criteria for the making of causal inferences, the differentials in inter-variable correlations between the two groups are further illustrated in Tables 32 and 33 which respectively show the partial regression estimates and direct and total indirect effects of causal variables for the two subgroups.

On a basis of a comparison of the unstandardized partial

Table 30. Correlation matrix of causal model variables for localite subgroup (n_1=132)

Variable	Zero-order correlation coefficients							
X_1 Socialization	-							
X_2 Communication	.362**	-						
X_3 Selectivity	.389**	.266**	-					
X_4 Scope	.583**	.501**	.314**	-				
X_5 Pervasiveness	.208*	.145	.210*	.294**	-			
X_6 Salience	.118	.129	.044	.258**	.197*	-		
X_7 Role tension	.200*	.162	-.085	.348**	.104	.233**	-	
X_8 Role performance	.460**	.361**	.249**	.502**	.330**	.222*	.177*	-

*Significant at .05 level.
**Significant at .01 level.

Table 31. Correlation matrix of causal model variables for cosmopolite subgroup (n_2=108)

Variable	Zero-order correlation coefficients							
X_1 Socialization	-							
X_2 Communication	.279**	-						
X_3 Selectivity	.133	.204*	-					
X_4 Scope	.352**	.553**	.250*	-				
X_5 Pervasiveness	.144	.197*	.060	.377**	-			
X_6 Salience	.028	.184	.231*	.368**	.298**	-		
X_7 Role tension	.125	.205*	.100	.345**	-.059	.273**	-	
X_8 Role performance	.196*	.274**	.274**	.560**	.330**	.353**	.277**	-

*Significant at .05 level.
**Significant at .01 level.

regression coefficients across subgroups or a comparison of the standardized path coefficients within subgroups, the causal parameter estimates presented in Table 32 suggest that socialization is relatively more important in comparison to communication in explaining the observed variation on scope for the localite subgroup. On the other hand the direct effect of communication on organizational scope within the cosmopolite subgroup is estimated as being over twice as important as the direct effect of socialization.

Other differentials in the causal parameter estimates between the two subgroups are also to be observed for the statistically significant relationships on role tension and role performance. The parameter estimates for two independent variables - selectivity and scope - are statistically significant at the 5 percent level in accounting for the observed variation on role tension for the localite directors with selectivity being negatively related to role tension. In comparison the parameter estimates for scope, pervasiveness and salience are statistically significant in explaining the variation on role tension for the cosmopolite subgroup. Two causal variables - scope and salience - are observed to be significantly related to role performance for the cosmopolite directors whereas the parameter estimates for socialization, scope and pervasiveness are statistically significant in explaining the variation on role performance within the localite

Table 32. Partial regression estimates[a] of causal relationships for localite-cosmopolite subgroups

Dependent and Independent Variables	Localite (n_1=132)				Cosmopolite (n_2=108)			
	F Value	Partial Reg. Coef.	Path Coef.	R^2	F Value	Partial Reg. Coef.	Path Coef.	R^2
X_4 SCOPE				.4367				.3478
X_1 Socialization	42.57	0.400	.462		6.82	0.210	.214	
X_2 Communication	22.15	0.053	.334		36.06	0.104	.493	
X_5 PERVASIVENESS				.0865				.1419
X_1 Socialization	-	-	-		-	-	-	
X_2 Communication	-	-	-		-	-	-	
X_4 Scope	12.31	0.237	.294		17.53	0.301	.377	
X_6 SALIENCE				.0664				.1356
X_3 Selectivity	-	-	-		-	-	-	
X_4 Scope	9.24	1.537	.258		16.63	2.322	.368	
X_5 Pervasiveness	-	-	-		-	-	-	
X_7 ROLE TENSION				.1627				.2000
X_3 Selectivity	6.43	-1.003	-.215		-	-	-	
X_4 Scope	23.96	0.416	.415		13.50	0.333	.363	
X_5 Pervasiveness	-	-	-		7.33	-0.299	-.261	
X_6 Salience	-	-	-		5.10	0.031	.217	
X_8 ROLE PERFORMANCE				.3270				.3389
X_1 Socialization	7.43	22.472	.243		-	-	-	
X_2 Communication	-	-	-		-	-	-	
X_3 Selectivity	-	-	-		-	-	-	
X_4 Scope	11.03	32.415	.304		34.07	57.241	.498	
X_5 Pervasiveness	6.25	25.124	.190		-	-	-	
X_6 Salience	-	-	-		3.93	3.084	.169	
X_7 Role tension	-	-	-		-	-	-	

[a]Regression coefficients statistically significant at .05 level only included.

Table 33. Direct and total indirect effects (TIE) of causal variables[a] on dependent variables[b] for localite-cosmopolite subgroups

Dependent and Independent Variables	Localite (n_1=132)		Cosmopolite (n_2=108)	
	Direct Effect	Total Indirect Effect	Direct	Total Indirect Effect
X_4 SCOPE				
X_1 Socialization	.462	.121	.214	.138
X_2 Communication	.334	.167	.493	.060
X_7 ROLE TENSION				
X_3 Selectivity	-.215	.130	-	-
X_4 Scope	.415	-.067	.363	-.018
X_5 Pervasiveness	-	-	-.261	.202
X_6 Salience	-	-	.217	.056
X_8 ROLE PERFORMANCE				
X_1 Socialization	.243	.197	-	-
X_4 Scope	.304	.198	.498	.062
X_5 Pervasiveness	.190	.140	-	-
X_6 Salience	-	-	.169	.053

[a]Includes only independent variables significantly related to the dependent variables.

[b]Indirect effects computed only on dependent variables for which multiple paths are involved.

subgroup.

The observed differentials in causal parameter estimates are presented in the empirically evaluated causal model diagrams for the localite subgroup in Figure 9 and in Figure 10 for the cosmopolite civil defense directors.

The ninety-five percent confidence intervals computed for each of the multiple correlation coefficients are shown in Table 34. As indicated, the differentials observed between

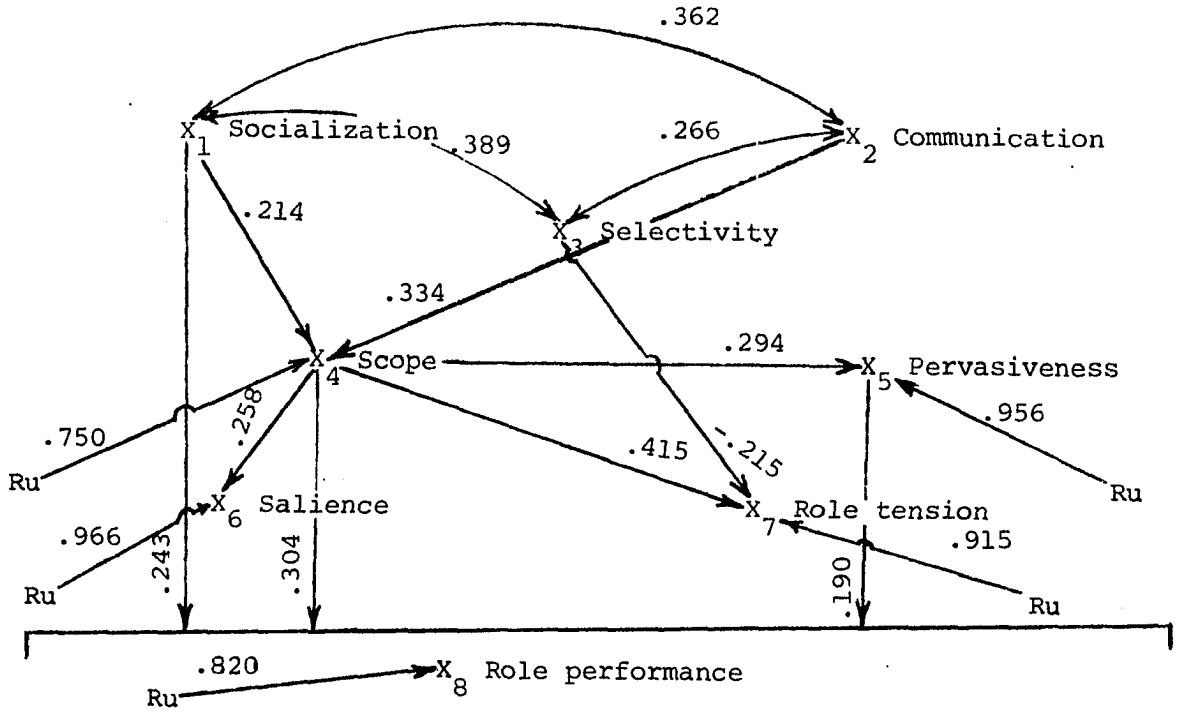

Figure 9. Empirically evaluated causal model of effectiveness in organizations for localite subgroups (n_1=132)

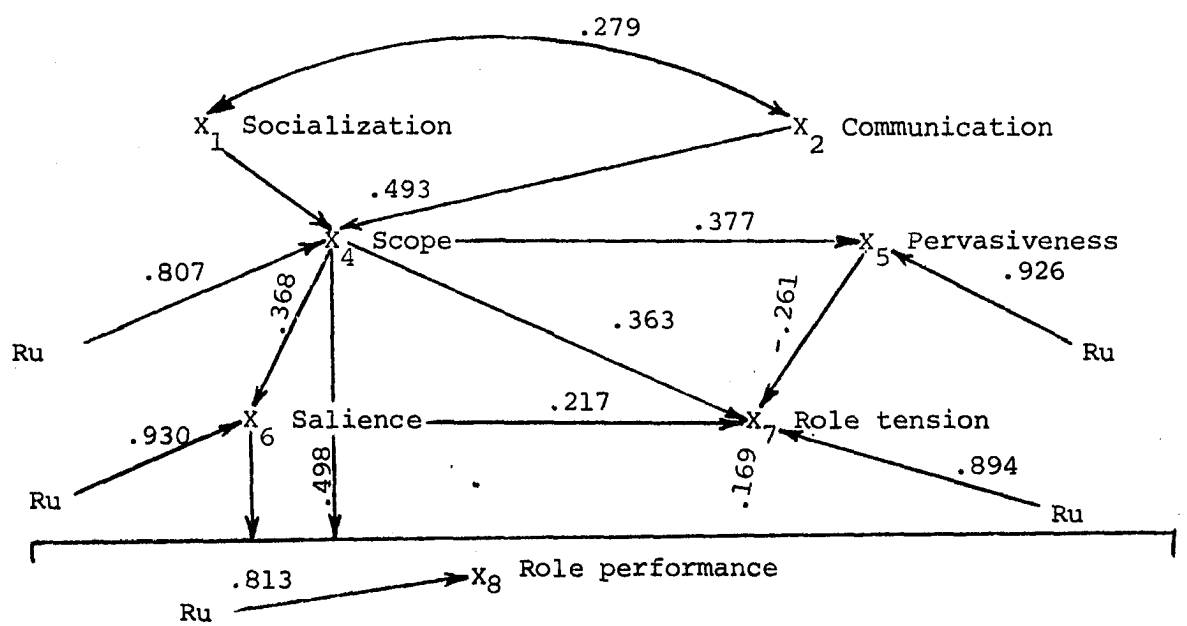

Figure 10. Empirically evaluated causal model of effectiveness in organizations for cosmopolite subgroup (n_2=108)

the two subgroups in the degree of explained variation on the five dependent variables are not statistically significant at the .05 level.

Table 34. Ninety-five percent confidence intervals for multiple correlation coefficients[a] for localite-cosmopolite subgroups

Multiple Correlation Coefficient	Localite (n_1=132)			Cosmopolite (n_2=108)		
	Value	Lower Limit	Upper Limit	Value	Lower Limit	Upper Limit
$R_{4.}$	.6608	.55	.75	.5897	.45	.70
$R_{5.}$	.2941	.12	.44	.3767	.21	.53
$R_{6.}$	.2577	.09	.41	.3682	.20	.52
$R_{7.}$	.3033	.14	.45	.4472	.28	.59
$R_{8.}$	.5718	.44	.67	.5821	.44	.69

[a]Multiple correlation estimates based on independent variables whose parameter estimates are significant at .05 level.

Localite-cosmopolite differentials in organizational effectiveness In considering the empirical evidence cited above it is suggested that local civil defense directors characterized as possessing a localite orientation can be differentiated from local civil defense personnel who are suggested as possessant of cosmopolite orientation in relation to the causal efficacy of organizational processes and

with respect to the strength of the interrelationships between organizational variables. In particular the evidence suggests that socialization is more important in producing changes in the degree to which the organization "embraces" the localite directors and in addition the initial "job orientation" received by the localite individuals has a direct impact and an indirect impact through organizational scope on the level of role performance effected by the localite directors. Indirect effects of socialization through scope on salience and role tension are also observed for the localite subgroup. In comparison the cosmopolite directors are observed to have significantly higher mean scores on six of the eight organizational variables with the communication process being relatively more important in directly affecting the degree to which the activities of the cosmopolite directors are limited to other civil defense personnel. The amount of communications effected by the cosmopolite individuals is not directly related to organizational variables other than scope, and is only indirectly related to pervasiveness, salience, role tension and role performance through its relationship with scope. The relative efficacy of the socialization and communication processes in directly and indirectly accounting for or "producing" changes on other organizational variables, thus, appears to be conditional or dependent upon the orientation (localite or cosmopolite) of the local civil defense directors toward

the organization.

As in the rural and part-time subgroups a negative relationship is observed between selectivity and role tension for the localite directors. And as indicated for the other two subgroups for which this inverse relationship is observed an intensive "job orientation" may be necessary for the localite individuals to insure compliance and a satisfactory level of effectiveness or role performance.

Minor differences in the empirically evaluated models appear to be evidenced in the degree to which the models for the two subgroups approximate the original relationships in the hypothetical model. Of theoretical significance is that socialization and communication are significantly related to scope in both subgroups and that the significant positive relationships between scope and pervasiveness, salience, role tension and role performance is empirically evidenced irrespective of the local civil defense personnels' orientation.

In general the empirically supported relationships for the two typological subgroups tend to reflect the relationships as empirically evaluated for their component educational, jurisdictional and pay-status subtypes. In particular the relative importance of communication for the cosmopolite subgroups tends to hold consistently across the full-time, urban location, and higher educational subgroups whereas the relative primacy of the socialization process in the lesser educated, rural and

part-time subgroups is also observed for the localite subgroup. However, the typological subgroups tend to evidence more statistically significant causal relationships than is observed for certain of their component subgroups which may, in part, be due to the confounding effects of other characteristics of the local civil defense directors on the relationships of concern when effects of disparate attributes are being evaluated.

In summary, it is suggested that the dimensions implied by the localite-cosmopolite typology tend to differentiate the total research sample in relation to the elevation of the regression intercepts and also the equivalency of the regression coefficients estimated for the independent causal variables in the causal model. As a result the empirical evidence tends to support the hypothesis that the localite-cosmopolite typology will function as a moderator variable in relation to the causal relationships encompassed by the causal model of effectiveness in organizations.

Assessment of composite measurement procedures

A summary of the scale analysis characteristics for the composite measures on socialization, scope, pervasiveness, salience and role performance is presented in Table 35. The complete correlation matrices, corrected item-total correlations and item means and standard deviations for the localite

Table 35. Characteristics of composite measurement scales for localite and cosmopolite subgroups

Composite Scale	Localite (n_1=132)				
	X_1	X_4	X_5	X_6	X_8
Criteria	Socialization	Scope	Pervasiveness	Salience	Performance
Coefficient of reliability[a]	.555**	.498	.916	.733*	.519*
Average inter-item correlation	.247	.186	.524	.167	.271
Range of inter-item correlations	.06 to .34	.02 to .44	.27 to .79	-.10 to .62	-.12 to .69
Range containing 60% of inter-item correlations	.19 to .34	.13 to .33	.44 to .63	.06 to .28	-.10 to .39
Range of means	3.66 to 6.75	0.71 to 7.47	0.38 to 0.65	10.52 to 15.00	51.75 to 584.97
Range of standard deviations	1.54 to 2.32	0.98 to 2.89	0.48 to 0.50	2.36 to 5.22	31.07 to 219.09

[a]Coefficient alpha.

*Observed differences between subgroups significant at .05 level.

**Observed differences between subgroups significant between .10 and .05 levels.

Cosmopolite (n_2=108)				
X_1 Socialization	X_4 Scope	X_5 Pervasiveness	X_6 Salience	X_8 Performance
.367**	.550	.913	.776*	.594*
.118	.190	.519	.209	.293
-.07 to .26	-.00 to .48	.33 to .74	-.10 to .55	-.05 to .73
-.06 to .24	.01 to .27	.41 to .62	.13 to .35	.05 to .41
3.83 to 7.80	1.40 to 8.93	0.54 to 0.77	11.96 to 15.33	75.92 to 533.36
1.63 to 2.25	1.03 to 2.40	0.42 to 0.50	1.68 to 4.99	17.03 to 238.21

and cosmopolite subgroups are included in the respective Appendices for the five variables. As indicated in Table 35, the two subgroups can be consistently differentiated with respect to errors of measurement, average inter-item correlations, range of inter-item correlations and the range containing 60% of the inter-item correlations on the socialization, salience and role performance composite scales. The localite subgroup is observed to have a significantly higher estimate of measurement reliability, a larger average inter-item correlation and smaller ranges containing a majority or the totality of the inter-item correlations on the measure of socialization whereas the cosmopolite subgroup is observed to have the same desired scale properties on the composite empirical measures of salience and role performance. The observed differences on the salience and role performance scales are statistically significant at the 5 percent level whereas a similar problem to that observed and discussed for the time and pay status subgroups is also evidenced on the estimates of reliability on the socialization scale for the typological subgroups in that the large arithmetic difference observed is statistically significant between the .10 and .05 levels.

Other differentials between the two subgroups are also observed with respect to: (1) the pattern and magnitude of statistically significant inter-item correlations and the

number of specific items which exceed the minimum item-total criterion for the role performance and pervasiveness scales; and (2) the patterning of statistically significant inter-item correlation coefficients on the composite measures of socialization and scope.

Localite-cosmopolite effects on empirical measurement procedures The above cited empirical evidence tends to support the hypothesis that the typological subgroups will function as a moderator variable in differentiating the total research sample of local civil defense directors in relation to the reliability of empirical measurement procedures and other composite scale properties.

As in the case of the disparate moderator attributes the desired scale analysis properties tend to be more closely approximated on certain composite measures in one subgroup than in the other and it is likewise suggested that the attenuation of theoretical relationships and R^2 values involving these particular variables may be more pronounced in one subgroup in comparison to the other. It is also suggested that the power of statistical tests involving these variables may tend to be more severely affected in one group than in the other in accordance with the magnitude of measurement error for the variable(s) under consideration. As suggested previously it is also meaningful to consider whether the dif-

ferentials observed in the substantive causal relationships are indicative of "true" differences in the underlying causal processes and intensities of causal relationships between the subgroups or if they are a reflection of differential errors of measurement on the variables of concern or both of these considerations acting simultaneously.

Summary

The empirical evidence cited above tends to support the hypotheses that three disparate and one typological antecedent background variable will function as moderator variables in differentiating the total research sample of local civil defense directors with respect to: (1) measurement reliability and other scale analysis properties; and (2) the relative efficacy of causal variables and magnitude of causal relationships in the causal model of effectiveness in organizations.

Evaluation of causal relationships

The stepwise regression procedure is used in estimating the "best-fitting" regression line for the five recursive equations within each of two subgroups for the four variables that are hypothesized as functioning as moderator variables in relation to the location and parallelism of the regression lines within each of the "moderated" subgroups. Standardized partial regression (path) coefficients which are statistically

significant at the .05 level are used as the major criterion in assessing the differential relative importance of causal variables and differential intensities of significant causal relationships within each of the "moderated" subgroups. Statistically significant unstandardized partial regression coefficients are utilized in evaluating differential causal efficacies and relative magnitudes of causal relationships between subgroups. Differences observed on the mean scores for the eight causal model variables are statistically evaluated on the basis of "t" tests in assessing if the "best-fitting" regression lines differ in locations. Ninety-five percent confidence intervals are computed for the multiple correlation coefficients in order to ascertain if the amount of observed variation on the dependent variables accounted for by the different "best-fitting" regression lines differ significantly between the subgroups for each of the moderator variables.

On the basis of the empirical analysis, differentials on the equivalency of estimated regression coefficients and relative importance of causal variables are evidenced by the formal education, jurisdictional location, time and pay status and typological subgroups. Differences in the elevation of the regression intercepts are also observed for the rural and urban, part-time and full-time, and localite-cosmopolite subgroups. Statistically significant differences in the

proportion of observed variation accounted for by the "best-fitting" regression equation within each subgroup are evidenced on role performance for the educational subgroups and on organizational scope for the rural and urban local civil defense directors.

In general, the "job orientation" received by the local directors upon or shortly after accepting their present positions appears to be relatively more important in comparison to the selectivity and communication processes in effecting changes in the role performance of the director and in the degree to which the civil defense organization "embraces" local civil defense personnel with 12 or less years of formal education, who are located in rural jurisdictions, who are part-time directors and who possess attributes suggestive of a localite orientation. In comparison, the communication process, relative to recruitment selectivity and organizational socialization processes, is observed to be more important in directly affecting the degree to which the local directors limit their activities to the civil defense organization and in indirectly effecting changes in other organizational variables for the local civil defense personnel with more than 12 years of formal education, who are full-time directors, who are located in urban centers, and who are characterized by a cosmopolite orientation. These latter results may be

indicative of differential abilities in, access to and predispositions toward effecting communication with members of the state civil defense staff on the part of these local civil defense personnel. In addition the empirical evidence indicates that local civil defense directors located in urban jurisdictions, who are full-time directors and who possess attributes suggestive of a cosmopolite orientation are observed to have significantly higher mean scores on at least six of the eight organizational variables encompassed by the causal model of organizational effectiveness.

Negative causal relationships between selectivity and role tension are observed for the part-time, localite and rural directors whereas positive relationships between selectivity and role performance and between selectivity and salience are evidenced by the directors with more than 12 years of formal education and by the full-time civil defense personnel respectively. These results may be interpreted as being supportive of the hypothesis that if recruitment selectivity is "low" or is based on fortuitous circumstances, initial "job orientation" efforts may have to be more effective if the requisite orientations and role commitments are to be developed and to offset any possible adverse effects of high levels of role tension observed for the rural, part-time and localite subgroups. This interpretation is generally

consistent with the observed relative importance of socialization in both directly and indirectly affecting organizational scope and role performance for the part-time, directors, the localite civil defense personnel and for the directors located in rural civil defense jurisdictions. The positive direct effects of selectivity on the importance attached to the civil defense organization by the full-time directors and on the level of role performance effected by the more highly educated directors may tend to be indicate that these "types" of directors are more "positively" selected or recruited for their civil defense positions.

Differentials are also observed between the various subgroups with respect to the degree to which the empirically evaluated causal models within each subgroup tend to approximate and support the variable relationships as hypothesized in the original causal model being evaluated. More parsimonious models (fewer statistically significant causal relationships) with statistically equivalent explanatory power in accounting for the observed variation on the five dependent variables are evidenced by the rural subgroup and by the full-time civil defense personnel. In general, however, a majority of the hypothesized relationships tend to be statistically supported across the differentiable subgroups. It is, thus, suggested that the general support observed for these relationships between subgroups tends to add greater support to

the original support to the original relationships under variant "background" conditions in comparison to support based on the empirical evaluation of these relationships for the total research sample. Although varying in intensity, six of the original relationships as hypothesized in the causal model are observed to be statistically significant in 7 of the 8 subgroups. These relationships are between: (1) socialization and scope; (2) communication and scope; (3) scope and pervasiveness; (4) scope and salience; (5) scope and role tension; and (6) scope and role performance. These results tend to indicate that, irrespective of the "background" of the local directors, the degree to which the civil defense organization "embraces" the lower participants, as effected by the socialization and communication processes, is an important factor in the subsequent role performance of the local civil defense personnel. It is also suggested that the comparisons between subgroups within moderator variable groupings may provide an approximation to the "ideal" experiment in the making of causal inferences on the basis of non-experimental data by indicating the differences as well as the similarities of causal relationships under divergent conditions or situations.

Assessment of composite measurement procedures

The data presented above tends to provide empirical evidence that moderator effects do occur in differentiating the total research sample of local civil defense directors with respect to the reliability of measurement and other scale analysis criteria on the composite measures of socialization, scope, pervasiveness, salience and role performance. On the basis of the χ^2 test for the equivalency of covariance matrices from which coefficient alpha is computed, statistically significant differences at the .05 level or between the .10 and .05 levels on the estimates of measurement reliability for the socialization, salience and role performance scales are evidenced between the subgroups for each of the moderator variables under consideration. Significant differences at the 5 percent level between the reliability estimates for the composite measure of scope are observed for the formal education and jurisdictional location subgroups with the reliability estimates on the pervasiveness scale being significantly different at the .05 level between the rural and urban subgroups. Differences between the "moderator" subgroups in the patterning and magnitude of statistically significant inter-item correlations, in the number and specific items which exceeded the minimum item-total criterion are observed for: (1) the educational subgroups on the role performance, scope and salience scales; (2) the jurisdictional

location subgroups on the composite measures of role performance and salience; (3) the time and pay status subgroups on the scope and salience scales; and (4) by the typological subgroups on the salience and role performance composite scales. Differences in the patterning and magnitude of statistically significant inter-item correlation coefficients are also observed on the role performance scale for the time and pay status subgroups, on the composite measure of socialization between the educational, jurisdictional location, time and pay status and typological subgroups; on the composite measure of scope for the jurisdictional and typological subgroups and on the pervasiveness scale between the time and pay status subgroups. Other differentials which are generally consistent with those cited above for particular composite measures in relation to the "moderator" subgroups are also evidenced in the range of inter-item correlations, the range containing 60 percent of the inter-item correlations and in relation to the presence of positive or negative inter-item correlation coefficients.

These observed differentials tend to be generally supportive of the hypotheses that divergent levels of formal education, jurisdictional locations, time and pay statuses and typological orientations will function as moderator variables in differentiating the total sample of local civil defense directors in relation to the five compositie measures under

consideration. In observing, however, that the differentiating effects on the composite scales vary as a function of the moderator variable being considered as well as in relation to the particular variable of concern as summarily shown in Table 36. The results presented in the columns of Table 36 tend to suggest that it is not possible to indicate that one moderator subgroup will evidence less measurement error consistently across the composite measurement procedures for the five variables.

Of particular interest in the results presented in the rows of Table 36 is that estimates of reliability on the socialization scale are significantly higher for those subgroups for which socialization is observed to be relatively more important in directly and indirectly accounting for the observed variation on scope and role performance. A further examination of the rows in Table 36 indicates that the more highly educated, urban, full-time and cosmopolite subgroups are observed to have significantly higher estimates of reliability on both the salience and role performance scales. These results tend to suggest that in being relatively more important to the lesser educated, rural, part-time and the localite subgroups the meanings of the socialization items may be more adequately apprehended by these "types" of local civil defense personnel. On the other hand the items on the salience and role performance scales may be more relevant to

Table 36. Moderator subgroups for which significantly higher measurement reliability estimates are observed on the five composite measurement scales

Composite Measurement Scale	Formal Education	Jurisdictional Location	Time and pay status	Typological subgroups
Socialization	≤ 12 years*	rural*	part-time**	Localite**
Scope	≤ 12 years*	urban*	n.s.d.[a]	n.s.d.[a]
Pervasiveness	n.s.d.[a]	rural*	n.s.d.[a]	n.s.d.[a]
Salience	>12 years*	urban*	full-time*	Cosmopolite*
Role performance	>12 years*	urban*	full-time*	Cosmopolite*

[a]Observed differences between subgroups not statistically different.

*Observed differences between subgroups significant at .05 level.

**Observed differences between subgroups significant between .10 and .05 levels.

the more highly educated, urban, full-time and cosmopolite directors.

On the basis of the above results it is suggested that the undesirable effects of measurement error on the attenuation of variable relationships and multiple correlation coefficients and on the power of statistical tests will vary not only in relation to the subgroup under consideration but also in relation to the particular variable of concern. In consideration of this phenomenon as evidenced by evaluating

the moderating effects of background variables on both the substantive relationships and measurement procedures, it is indicated that the results of particular variables to evidence statistically nonsignificant causal parameter estimates and varying intensities of causal relationships across subgroups may be as indicative of differential errors of measurement on the particular variable as they are indicative of different underlying causal processes within the subgroups. This consideration will be explored further in the implications section of Chapter 7 below.

In general, it is observed that the descriptive and other summarizing statistics and the estimates of causal parameters and reliability of measurement for the total sample are weighted averages of the comparable statistics and estimates for the "moderated" subgroups. These results support the observations of previous researchers that the "abbreviated" interpretations given to statistical estimates for the overall sample tend to obscure meaningful substantive and statistical differences.

CHAPTER 7. SUMMARY AND IMPLICATIONS

Introduction

The movement toward more sophisticated methodologies in the social science in the evaluation of causal models has necessitated that greater attention be devoted to the measurement of sociological variables if the resultant theoretical and inferential statements are to adequately reflect the social phenomena which these statements purport to represent. Recent emphasis on the problems of measurement procedures in the social sciences accompanying the trends to causal analytic techniques have indicated that the presence of measurement error on the theoretical variables under consideration tends to obscure the "true" nature of the theoretical relationship(s) under consideration. In addition it is indicated that the presence of measurement errors on the variables of concern tends to adversely affect the robustness of statistical techniques and reduce the value of the coefficient of determination (R^2) which is one of the major criteria utilized in the social sciences for evaluating the adequacy of a set of independent variables in explaining or accounting for the observed variation of the dependent variables.

In dealing with similar measurement problems in the prediction of academic and job placement success, the concept of

the moderator variable was formulated in industrial and educational psychology as one means of alleviating the undesirable effects of errors of measurement on their prediction and selection equations. In observing that errors of measurement varied from individual to individual on any particular administration of a measurement instrument, these researchers indicated that errors of measurement were predictable on the basis of other independent variables. As a result heterogenous aggregations of individuals could be subdivided into homogenous groups with respect to measurement errors. In so doing, it is possible to differentiate those individuals for whom the test has a greater degree of measurement reliability from those for whom the test has lesser reliability as one means of improving the reliability of measurement procedures. The differentiation process, in effect, recognizes that differences between individuals may exist in relation to: (1) existence or nonexistence of viable responses; (2) diverse meanings evoked by the measurement stimulii; (3) differential abilities to discriminate between response frameworks especially at ordinal and higher levels of measurement; and (4) divergent environmental factors operant on the individual at any particular time.

Analogous procedures in sociology have indicated that subgroups of individuals can be differentiated with respect to substantive variable relationships. These formulations

have indicated that total research samples can be stratified into subgroups which evidence: (1) differential intensities of variable relationships under divergent background or social conditions; (2) differential efficacies of causal variables; and (3) different underlying causal processes. In effect, these researchers suggest that superior results in multi-variate analyses are achievable by estimating a "best-fitting" regression line for each of the differentiable subgroups than by "fitting" one regression equation for the entire research sample. It is, thus, suggested that greater explanatory power may be imparted to the analysis and relational inferences by referring the observed variations to specific "moderator" variables rather than by obscuring the differences in single summarizing estimates.

The dissertative inquiry and the empirical results reported herein are primarily of an exploratory nature in assessing the general applicability of the moderator variable concept to the analysis of causal models in sociology. Specifically, the objectives of concern are to:

1. identify social-psychological or demographic variables which theory and previous research indicate will function as moderator variables in differentiating the total research sample of concern;

2. comparatively assess the effects of differentiating the research sample on the estimates of measurement reliability and other scale analysis properties;

3. assess the comparative effects of the moderator variables on the relative efficacy of causal variables, the magnitude of causal relationships and the causal inferences derived therefrom for each of the subgroups;

4. evaluate the comparative approach inherent in the moderator variable procedure as a viable alternative to the "ideal" experiment in causal analyses; and

5. assess the implications of moderator variables as a means of more closely approximating the assumptions of causal model analytic techniques.

Methodological Considerations

An eight variable causal model of effectiveness in organizations as formulated and empirically evaluated by Mulford et al. (1972a) is subjected to further empirical evaluation in order to assess the effects of subgrouping the total research sample of 240 local civil defense directors on the causal parameter estimates and on the characteristics of the five composite variables encompassed by the model. The composite variables are socialization, scope, pervasiveness, salience and role performance.

Three disparate "moderator" attributes of the local civil

defense personnel or of their jurisdictional environments are identified which theory and previous research findings indicate will differentially influence the lower participants' predisposition toward and performance in an organizational environment. The three variables are formal educational background, time and pay status and rural or urban jurisdictional locations. A fourth moderator variable was developed in "reconstructing" the local civil defense director by combining the three individual moderator variables in a typological reduction framework. A methodological dilemma is encountered in attempting to develop substantively meaningful and relatively homogenous subgroups for each of the moderator variables and at the same time maintain relatively sizable subgroups for statistical purposes. As a result each of the moderator variables are dichotomized into relatively meaningful subgroups although the degree of homogeneity in several of the subgroups is questionable.

The stepwise regression procedure is utilized in estimating unstandardized partial and standardized (path) regression coefficients for the five recursive equations within the two subgroups for the four moderator variables. Parameter estimates which are not statistically significant at the 5 percent level on the basis of F values are eliminated from the analysis and empirically evaluated causal model for each subgroup. Ninety-five percent confidence intervals are computed for the multiple correlation coefficients ($R_{ij \cdot k}$) in

ascertaining if the degree of observed variation on the five dependent variables accounted for by the statistically significant causal parameters in each subgroup are significantly different.

Coefficient alpha is used as estimate of measurement reliability and is the major criterion utilized in assessing the effects of the four moderator variables on the composite measures of concern. A χ^2 test for the equivalency of the variance-covariance matrices from which coefficient alpha is computed is employed in determining if the observed estimates for the moderated subgroups are significantly different or could have occurred on the basis of chance factors. Other scale analysis properties such as the range of inter-item correlations, the range containing 60 percent of the inter-item correlations, the range of inter-item correlations and the minimum item-total criterion $1/\sqrt{k}$ are used in conjunction with the reliability estimates in indicating further differentials between the subgroups. These latter criteria are also meaningful if empirical adjustments of the composite scales are to be made in data analyses or future research procedures.

Empirical Results

Differentiation of composite measures

The empirical evidence tends to support the hypotheses that the total research sample of local civil defense directors can in general be significantly differentiated on the five composite measures of concern with respect to estimates of measurement reliability. Further differentials but not subjected to statistical analyses are also evidenced between the "moderated" subgroups in relation to other scale analysis properties such as: (1) range of inter-item correlation; (2) range containing 60 percent of the inter-item correlations; (3) the presence of positive or negative inter-item correlations; (4) the patterning and magnitude of statistically significant inter-item correlations; and (5) the specific scale items which exceed the minimum item-total criterion.

However, no clear cut pattern is evidenced in relation to the degree to which any particular subgroup is observed to evidence significantly higher reliability estimates and to more closely approximate the desired scale analysis properties consistently across all five composite measures. As a result particular subgroups more closely approximate the measurement norms on certain scales and to a lesser degree on other scales whereas the opposite is evident for the companion subgroups. Previous researchers have indicated that moderator variables

tend to be fairly specific and it is not possible to state any general principles about the nature of attributes that may act as moderators for any given population of individuals. On the basis of the empirical results presented it also appears that potential moderators may be fairly specific to substantive areas or to the item content of measurement instruments.

It would, thus, appear that the adverse effects of errors of measurement on statistical tests and the attenuation of causal parameters and coefficients of determination may vary in relation to the subgroup of concern but also in relation to the particular variable(s) entering the relationships. This consideration is discussed further in the evaluation of causal relationships and implications sections of this chapter.

Evaluation of causal relationships

The empirical results presented in Chapter 6 tend to support the hypotheses that the relative importance of causal variables and relative magnitude of causal parameter estimates can be differentiated in relation to the educational achievements, time and pay statuses, jurisdictional locations and typological orientations of the local civil defense directors.

On the basis of the empirical evidence it is suggested

that the relative efficacy of causal variables is conditional or dependent upon the particular "type" of local civil defense director for whom the causal parameters are estimated. In particular, it is observed that the amount of "job orientation" received by local personnel with 12 or less years of education, who are located in rural areas, who are part-time directors and who are characterized by a localite orientation is relatively more important in comparison to other organizational processes in directly effecting the degree to which the local directors become jointly involved in organizational activities and in "producing" higher levels of role performance. The socialization process is also observed to have a direct impact on the degree to which the directors located in rural civil defense areas are committed to and have internalized the organizational norms.

On the other hand the communication process appears to be relatively more efficacious in directly effecting the degree to which local personnel with more than 12 years of formal education, who are located in urban centers, who are full-time personnel and who have characteristics suggestive of a cosmopolite orientation are "embraced" by the civil defense organization in limiting their activities to other local civil defense personnel. These "types" of directors are observed to have only indirect "communication" effects through organizational scope on subsequent variables in the

causal model of organizational effectiveness. In comparison communication was observed to have a statistically significant relationship with role performance for the total research sample.

Several statistically significant relationships involving recruitment selectivity which tended to be "obscured" in the parameter estimates for the total research sample are evidenced by the educational, jurisdictional location, time and pay status and typological subgroups. A negative relationship between selectivity and role tension is observed for the part-time, rural and localite subgroups whereas a positive relationship is observed between recruitment selectivity and the emotional significance (salience) which the full-time directors attach to their participation in civil defense activities. A positive relationship between recruitment selectivity and role performance is observed for the local civil defense personnel with more than 12 years of formal education.

The above cited results in general tend to be suggestive that for certain "types" of directors greater emphasis needs to be devoted to their initial orientation to the organization whereas other "types" of directors may tend to be more "rationally" and "positively" recruited into the organization in exhibiting more anticipatory socialization and thus require less formal socialization on the part of organization. It is

also suggested that these latter directors - the more highly educated, who are located in urban centers, who are full-time participants and who are characterized by a cosmopolite orientation - are possessant of greater capabilities in and predispositions toward effecting communication from a variety of sources. The results also tend to indicate that full-time directors irrespective of their pay status may derive a more meaningful self-definition from their civil defense role in comparison to local personnel who divide their energies and time between several roles.

However, these results must be tempered to some degree in recognizing that in certain subgroups, variables which are observed to have statistically nonsignificant causal parameter estimates or relatively low causal parameter values are also those variables which evidence the largest errors of measurement. This is particularly evident, for example, in the time and pay status and typological subgroups in relation to the socialization variable. In the full-time subgroup, the estimated reliability on the composite measure of socialization is .229 and socialization is also observed to have a statistically nonsignificant relationship with scope. A similar trend is evidenced in the cosmopolite subgroup in which the path value between socialization and scope is less than half the value between communication and scope and in the same subgroup the reliability estimate on socialization is .367. It is,

therefore, indicated that any conclusions about the differential relative importance of variables or about differential underlying causal processes between subgroups as based on the present study must be held in abeyance until a more explicit integration of the measurement and causal relationship implications is effected. The observed differentials may be reflecting errors of measurement as much as they are indicative of different causal processes.

The above dicussion has tended to emphasize the differentials between subgroups but it is also necessary to recognize that certain similarities and comparabilities of significant causal relationships are evidenced between subgroups within moderator variable categories as well as across moderator variables. Although varying in intensity, statistically significant causal parameter estimates are in evidence in seven subgroups for the relationships between: (1) socialization and scope; (2) scope and pervasiveness; (3) scope and salience; and (4) scope and role performance. Statistically significant causal relationships of varying intensities are observed in all eight subgroups between communication and scope and between scope and role tension. These results tend to suggest that the moderator variable approach may provide an expost facto approximation to the "ideal" experiment in causal analyses in showing that differentials as well as comparabilities obtain under divergent

"controlled" conditions. More importantly from a theoretical standpoint, these results tend to provide fairly general support for the above cited relationships as hypothesized by Etzioni and Mulford and others in emphasizing the importance of the socialization and communication processes in an organizational setting and the centrality of organizational scope in effecting the organizational performance of a variety of "types" of lower participants.

Implications

Several implications for sociological theory, organizational theory and policy and sociological methodology are apparent to the author from the exploratory assessment of the moderator variable concept as presented below.

Implications for sociological theory

1. More rigorous theory may result from the separate interpretations required within each of the moderator subgroups.

2. "Moderated" or conditional relationships may violate the sense of order and the search for universals due to differential or inconsistent results between subgroups but at the same time it may be possible to develop general principles of the "if-then" form which obtain under a variety of conditions.

3. The evaluation of substantive hypotheses are often

based on an assessment of differences between groups without any indication as to how the groups are hypothesized to be different. The results presented in this dissertation tend to indicate that groups may be substantively differentiated in several ways as below:

(a) group means are different and variances are equal

(b) group means are equivalent but variances are different

(c) both group means and group variances are different

(d) differential interrelationships are to be observed among substantive variables as to (1) the existence or nonexistence of a relationship; (2) the magnitude of the observed relationships and (3) the nature (linear, curvilinear, etc.) of the relationship.

These results tend to imply that in the movement toward more sophisticated methodologies and assessment of theoretical propositions that more emphasis should be devoted to specifying and identifying how the groups under consideration are to be differentiated.

4. No clear cut guidelines are available in the literature or from the empirical results as to indicate the most appropriate research situations in which to apply the moderator variable technique. It would appear, however, that when relatively heterogenous populations are involved or when

important substantive explanatory background variables do not enter into the causal equations in an additive sense that interactive relationships or moderator effects should be considered. In addition theory frequently indicates that differentiable population subgroups (rural-urban, race, sex, divergent social psychological orientations, for example) should be considered in empirical research.

5. Although several statistical procedures are available for the identification of potential moderator variables, greater substantive meaning and control would appear to be attainable by utilizing those variables which theory and previous research indicates may have interactive effects on the relationships of concern. More substantively meaningful subgroups are also attainable by using socially and theoretically meaningful breaking points rather than utilizing those available from statistics such as median, percentiles, quartiles and so forth.

Implications for organizational theory and policy

1. General support is provided for the theoretical relevance of the socialization and communication processes and the central role of organizational scope on the subsequent performance and effectiveness of divergent "types" of lower participants in different social and cultural situations.

2. Theoretically meaningful results may be evident

within the subgroups which otherwise may be "obscured"in the total sample.

3. More accurate and resource saving policy decisions may be effected by concentrating on those variables and relationships which are observed to be relatively more important for each subgroup. For example the empirical results presented tend to indicate that: (1) for local civil defense directors with 12 or less years of education, for directors in rural civil defense jurisdictions, for part-time civil defense personnel and for directors characterized by attributes suggestive of a localite orientation that the initial "job orientation" received is a relatively important factor in these directors subsequent organizational performance. An intensive "job orientation" would particularly appear to be necessitated under conditions of "low" recruitment selectivity: and (2) an emphasis should be placed on encouraging all local civil defense directors irrespective of their backgrounds or location to interact with each other and to jointly participate in organizational activities.

Implications for sociological methodology

1. More complex but realistic assumptions are introduced into the analysis in recognizing possible interaction between variables excluded from the model and the relationships under consideration.

2. An expost facto approximation to the "ideal" experi-

ment under natural conditions is possible in showing that differences but also similarities are to be observed under "controlled" background conditions or situations.

3. The recognition that errors of measurement and other scale analysis properties vary across individuals violates the search for standardized universal measurement instruments but at the same time it focuses explicit attention on the differences which exist between people in relation to the presence or absence of the trait being measured and the differential capabilities of people to evoke the correct meaning for the measurement stimulii. These results tend to imply that measurement procedures can be differentiated with respect to conceptual indicators or the validity of measurement across people as well as in relation to the reliability and other measurement criteria within a research population. Greater emphasis on the population - measurement unit in the development of measurement instruments would thus appear to be desirable if optimal results are to be achieved in the operationalization of social science concepts.

4. Considerable confusion is evident in the literature in relation to not only the meaning of measurement reliability but also in relation to: (1) the meaning and desirability or undesirability of homogeneity and heterogeneity of multiple items; (2) the implications of divergent item means and standard deviations for the interpretation of empirical

measures; and (3) the differences implied by terms such as composite measures, scales and indexes. It would appear that considerable ambiguity will continue to exist in the social sciences until a degree of concensus is achieved with respect to the meanings of these terms and the implications of these criteria for empirical research.

4. A more effective application of statistical procedures such as correction for attenuation and errors-in-variables or the empirical adjustment of composite scales would appear to be possible by using the appropriate subgroup estimates and values rather than by applying "average" corrections or adjustments on the basis of total sample estimates.

Further Research Needs

In order to more adequately assess the implications of the moderator variable in sociology, further research is suggested as being required in:

1. More explicitly integrating the measurement and relational differentials by the application of the errors-in-variables procedure within each subgroup a priori to the empirical evaluation of the causal relationships.

2. Developing subgroups with a greater degree of homogeneity and theoretical meaning from larger research samples in order to more adequately meet the homogeneity assumption underlying the moderator variable concept.

3. Further researching the most appropriate estimate of reliability to be utilized and the statistical procedure to be used in assessing the statistical significance of observed differences on measurement reliability estimates.

REFERENCES

Abrahams, Norman M. and Edward Alf, Jr.
1972 "Pratfalls in moderator research." Journal of Applied Psychology 56 (June): 245-251.

Argyris, Chris
1959 "The individual and organization: An empirical test." Administrative Science Quarterly 4 (September): 145-167.

Barnard, Chester
1938 The Function of the Executive. Cambridge, Mass.: Harvard University Press.

Bauer, Raymond A.
1967 "The obstinate audience: The influence process from the point of view of social communication." Chapter 41 in Edwin P. Hollander and Raymond Hunt (eds.), Current Perspectives in Social Psychology. New York: Oxford University Press.

Beal, George M.
1966 "Additional hypotheses in participation research." Rural Sociology 21 (Sept.-Dec.): 249-256.

Bennis, Warren G.
1959 "Leadership theory and administrative behavior: The problem of authority." 4 (December): 259-301.

Bennis, W. G., N. Berkowtiz, M. Affinito and M. Malone
1958 "Reference groups and loyalties in the out-patient department." Administrative Science Quarterly 2 (March): 481-500.

Berdie, Ralph F.
1961 "Intra-individual variability and predictability." Educational and Psychological Measurement 21 (No. 3): 663-676.

Blalock, Hubert M., Jr.
1961 "Evaluating the relative importance of variables." American Sociological Review 26 (February): 866-874.

Blalock, Hubert M., Jr.
1962a "Further observations on asymmetric causal models." American Sociological Review 27 (August): 542-545.

Blalock, Hubert M., Jr.
1962b "Spuriousness versus intervening variables: The problem of temporal sequences." Social Forces 40 (May): 330-336.

Blalock, Hubert M., Jr.
1964a Causal Inferences in Nonexperimental Research. Chapel Hill: The University of North Carolina Press.

Blalock, Hubert M., Jr.
1964b "Controlling for background factors: Spuriousness versus developmental sequences." Sociological Inquiry 34 (Winter): 28-40.

Blalock, Hubert M., Jr.
1965 "Theory building and the statistical concept of interaction." American Sociological Review 30 (June): 374-380.

Blalock, Hubert M., Jr.
1966 "Some implications of random measurement error for causal inferences." American Journal of Sociology 71 (January): 37-47.

Blalock, Hubert M., Jr.
1967 "Path coefficients versus regression coefficients." American Journal of Sociology 72 (May): 675-676.

Blalock, Hubert M., Jr.
1968a "The measurement problem: a gap between the languages of theory and research." Chapter 1 in Hubert M. Blalock, Jr. and Ann B. Blalock (eds.), Methodology in Social Research. New York: McGraw-Hill Book Co.

Blalock, Hubert M., Jr.
1968b "Theory building and causal inferences." Chapter 5 in Hubert M. Blalock, Jr. and Ann B. Blalock (eds.), Methodology in Social Research. New York: McGraw-Hill Book Co.

Blalock, Hubert M., Jr.
1969a Theory Construction. Englewood Cliffs, N.J.: Prentice-Hall, Inc.

Blalock, Hubert M., Jr.
1969b "Comment on Coleman's paper." Pp. 115-121 in Robert Bierstedt (ed.), A Design for Sociology: Scope, Objectives and Methods. Philadelphia: American Academy of Political and Social Science, Monograph 9 (April).

Blalock, Hubert M., Jr.
1970 An Introduction to Social Research. Englewood Cliffs, N.J.: Prentice-Hall, Inc.

Blalock, Hubert M., Jr.
1971a Causal Models in the Social Science. Chicago: Aldine-Atherton, Inc.

Blalock, Hubert M., Jr.
1971b "Causal inferences, closed populations, and measures of association." Chapter 8 in H. M. Blalock, Jr. (ed.), Causal Models in the Social Sciences. Chicago: Aldine-Atherton, Inc.

Blalock, Hubert M., Jr.
1972 Social Statistics. New York: McGraw-Hill Book Co.

Blau, Peter M. and W. Richard Scott
1962 Formal Organizations. San Francisco: Chandler Publishing Co.

Blumer, Herbert
1969 Symbolic Interactionism: Perspective and Method. Englewood Cliffs, N.J.: Prentice-Hall, Inc.

Bohrnstedt, George W.
1969 "Observations on the measurement of change." Chapter 4 in Edgar F. Borgatta (ed.), Sociological Methodology 1969. San Francisco: Jossey-Bass Inc.

Bohrnstedt, George W.
1970 "Reliability and validity in attitude measurement." Chapter 3 in Gene F. Summers (ed.), Attitude Measurement. Chicago: Rand McNally and Co.

Bohrnstedt, George W. and T. Michael Carter
1971 "Robustness in regression analysis." Chapter 5 in Herbert L. Costner (ed.), Sociological Methodology 1971. San Francisco: Jossey Bass Inc.

Borgatta, Edgar F.
1969 "The current status of methodology in sociology." Prologue in Edgar F. Borgatta (ed.), Sociological Methodology 1969. San Francisco: Jossey Bass Inc.

Brim, Orville G., Jr.
1968 "Adult socialization." Chapter 5 in John A. Clausen (ed.), Socialization and Society. Boston: Little, Brown and Co.

Brim, Orville G., Jr.
1969 "Socialization in later life." Pp. 238-248 in Edgar F. Borgatta (ed.), Social Psychology: Readings and Perspective. Chicago: Rand McNally and Co.

Bross, Irwin D. J.
1953 Design for Decision. New York: The Macmillan Co.

Bucher, Rue, Joan Stelling and Paul Dommermuth.
1969 "Differential prior socialization: A comparison of four professional training programs." Social Forces 48 (December): 213-223.

Bunge, Mario
1959 Causality. Cambridge, Mass.: Harvard University Press.

Burgess, Robert L.
1969 "Communication networks and behavioral consequences." Human Relations 22 (April): 137-159.

Campbell, Donald T. and Thelma H. McCormack
1957 "Military experience and attitudes toward authority." American Journal of Sociology 62 (March): 482-490.

Campbell, Donald T. and Julian C. Stanley
1963 Experimental and Quasi-experimental Designs for Research. Chicago: Rand McNally and Co.

Campbell, Ernest Q. and C. Normal Alexander
1970 "Structural effects and interpersonal relationships." Pp. 315-321 in Dennis P. Forcese and Stephen Richer (eds.), Stages of Social Research. Englewood Cliffs, N.J.: Prentice-Hall, Inc.

Carter, Lewis F.
1971 "Inadvertent sociological theory." Social Forces 50 (September): 12-25.

Cartwright, Dorwin
1959 "Power: a neglected variable in social psychology." Chapter 1 in Dorwin Cartwright (ed.), Studies in Social Power. Ann Arbor: The University of Michigan.

Cattell, Raymond B.
1967 "Suggested restructuring of the concept of reliability." Chapter 8 in David A. Payne and Robert F. McMorris(eds.), Educational and Psychological Measurement Waltham, Mass.: Blaisdell Publishing Co.

Cicourel, Aaron V.
1964 Method and Measurement in Sociology. New York: The Free Press.

Cleary, T. Anne
1966 "An individual differences model for multiple regression." Psychometrika 31 (June): 215-223.

Cleary, T. Anne, Robert L. Linn and G. William Walster
1970 "Effect of reliability and validity on power of statistical tests." Chapter 7 in Edgar F. Borgatta and George W. Bohrnstedt (eds.), Sociological Methodology 1970. San Francisco: Jossey-Bass Inc.

Cochran, W. G.
1970 "Some effects of errors of measurement on multiple correlation." Journal of the American Statistical Association 65 (March): 22-34.

Cochran, William G.
1971 "Analysis of covariance: Its nature and uses." Chapter 3.3 in Joseph A. Steger (ed.), Readings in Statistics for the Behavioral Scientist. New York: Holt, Rinehart and Winston, Inc.

Coleman, James S.
1969 "The methods of sociology." Pp. 86-114 in Robert Bierstedt(ed.), A Design for Sociology: Scope, Objectives, and Methods. Philadelphia: American Academy of Political and Social Science, Monograph 9 (April).

Conger, Anthony J.
1969 "An analysis of Ghiselli's moderator variable." Psychological Reports 25 (October): 519-527.

Converse, Philip E.
1970 "Attitudes and nonattitudes: continuation of a dialogue." Pp. 168-189 in Edward R. Tufte (ed.), The Quantitative Analysis of Social Problems. Reading, Mass.: Addison-Wesley Publishing Co.

Coombs, C. H.
1950 "The concepts of reliability and homogeneity." Educational and Psychological Measurement 10 (Spring): 43-56.

Copp, James H.
1956 Personal and Social Factors Associated with the Adoption of Recommended Farm Practices Among Cattlemen. Agricultural Experiment Station Technical Bulletin No. 83. Kansas State College, Manhattan, Kansas.

Cosby, Arthur G. and J. Steven Picou
1972 "Structural models and occupational aspirations: black-white variations among deep-south adolescents." Journal of Vocational Behavior 3 (January): 1-14.

Cronbach, Lee J.
1967 "Coefficient alpha and the internal structure of tests." Chapter 18 in William A. Mehrens and Robert L. Ebel (eds.), Principles of Educational and Psychological Measurement. Chicago: Rand McNally and Co.

Dahrendorf, Ralf
1959 Class and Class Conflict in Industrial Society. Stanford, Calif.: Stanford University Press.

Darlington, Richard B.
1968 "Multiple regression in psychological research and practice." Psychological Bulletin 69 (February): 161-182.

Denzin, Norman K.
1970 The Research Act. Chicago: Aldine Publishing Co.

Dewey, Richard
1966 "The rural-urban continuum: real but relatively unimportant." Chapter 9 in Roland L. Warren (ed.), Perspective on the American Community. Chicago: Rand McNally and Co.

Doby, John T.
1969 "Logic and levels of scientific explanation." Chapter 5 in Edgar F. Borgatta (ed.), Sociological Methodology 1969. San Francisco: Jossey-Bass Inc.

Draper, N. R. and H. Smith
1966 Applied Regression Analysis. New York: John Wiley and Sons, Inc.

Dubin, Robert
1969 Theory Building. New York: The Free Press.

Dubin, Robert
1971 "Theory and research." Chapter 3 in Richard O'Toole (ed.), The Organization, Management and Tactics of Social Research. Cambridge, Mass.: Schenkman Publishing Co.

Duggan, Thomas J. and Charles W. Dean
1969 "Statistical interaction and parole prediction." Social Forces 48 (September): 45-49.

Duncan, James A. and Burton W. Kreitlow
1954 "Selected cultural characteristics and the acceptance of educational programs and practices." Rural Sociology 19 (December): 349-357.

Duncan, Otis Dudley
1966 "Path analysis: sociological examples." American Journal of Sociology 72 (July): 1-16.

Duncan, Otis Dudley
1970 "Partials, partitions and paths." Chapter 3 in Edgar F. Borgatta (ed.), Sociological Methodology 1970. San Francisco: Jossey-Bass, Inc.

Eichholtz, Gerhard and Everett M. Rogers
1972 "Resistance to adoption of audiovisual aids by elementary school teachers: contrasts and similarities to agricultural innovation." Chapter 57 in Gerald Zaltman, Philip Kotler and Ira Kaufman (eds.), Creating Social Change. New York: Holt, Rinehart and Winston, Inc.

Etzioni, Amitai
1961 A Comparative Analysis of Complex Organizations. New York: The Free Press.

Flinn, William L.
1970 "Influence of community values on innovativeness." American Journal of Sociology 75 (May): 983-991.

Forbes, Hugh Donald and Edward R. Tufte
1970 "A note of caution in causal modeling." Pp. 370-379 in Dennis P. Forcese and Stephen Richer (eds.), Stages of Social Research. Englewood Cliffs, N.J.: Prentice-Hall, Inc.

Francis, Roy G.
1961 The Rhetoric of Science. Minneapolis: The University of Minnesota Press.

Fredericksen, Norman and S. Donald Melville
1954 "Differential predictability in the use of test scores." Educational and Psychological Measurement 14 (Winter): 647-656.

French, John R. Jr. and Richard Snyder
1959 "Leadership and interpersonal power." Chapter 8 in Dorwin Cartwright (ed.), Studies in Social Power. Ann Arbor: The University of Michigan.

French, John R. P., Jr. and Bertram Raven
1968 "The bases of social power." Chapter 20 in Dorwin Cartwright and Alvin Zander (eds.), Group Dynamics. New York: Harper and Row.

Frenkel-Brunswick, Else
1964 "Interaction of psychological and sociological factors in political behavior." Pp. 363-380 in Daniel Katz, Dorwin Cartwright, Samuel Eldersvel and Alfred McLung-Lee (eds.), Public Opinion and Propaganda. New York: Holt, Rinehart and Winston.

Ghiselli, Edwin E.
1960 "The prediction of predictability." Educational and Psychological Measurement 20 (Spring): 3-8.

Ghiselli, Edwin E.
1963 "Moderating effects and differential reliability and validity." Journal of Applied Psychology 47 (April): 81-86.

Ghiselli, Edwin E.
1964 Theory of Psychological Measurement. New York: McGraw-Hill Book Co.

Ghiselli, Edwin E.
1966 The Validity of Occupational Aptitude Tests. New York: John Wiley and Sons, Inc.

Ghiselli, Edwin E.
1972 "Comments on the use of moderator variables." Journal of Applied Psychology 56 (June): 270.

Ghiselli, Edwin E. and Eric P. Sanders
1967 "Moderating heterodasticity." Educational and Psychological Measurement 27 (Autumn): 581-590.

Glock, Charles Y.
1967 "Survey design and analysis in sociology." Pp. 1-62 in Charles Y. Glock (ed.), Survey Research in the Social Sciences. New York: Russell Sage Foundation.

Gordon, Robert A.
1968 "Issues in multiple regression." American Journal of Sociology 73 (March): 592-616.

Gouldner, Alvin W.
1957 "Cosmopolitans and locals: toward an analysis of latent social roles - I. Administrative Science Quarterly 2 (December): 281-306.

Gouldner, Alvin W.
1958 "Cosmopolitans and locals: toward an analysis of latent roles - II. Administrative Science Quarterly 2 (March): 444-480.

Gouldner, Helen P.
1960 "Dimensions of organizational commitment." Administrative Science Quarterly 4 (March): 468-490.

Grosof, Elliott H., Llewellyn Z. Gross, Constantine A. Yeracans and Walter C. Hobbs
1970 "Anchorage in organizations: A dialectic theory." Social Forces 49 (September): 81-90.

Gross, Neal and Marvin J. Taves
1952 "Characteristics associated with acceptance of recommended farm practices. Rural Sociology 17 (December): 321-327.

Guetzkow, Harold
1965 "Communications in organization." Chapter 12 in James G. March (ed.), Handbook of Organizations. Chicago: Rand McNally and Co.

Guttman, Louis
1945 "A basis for analyzing test-retest reliability." Psychometrika 10 (December): 255-283.

Hall, Douglas T., Benjamin Schneider and Harold T. Nygren
1970 "Personal factors in organizational identification." Administrative Science Quarterly 15 (June): 176-190.

Hall, Richard H.
1972 Organization Structure and Processes. Englewood Cliffs, N.J.: Prentice-Hall, Inc.

Hannan, Michael T.
1970 Problems of Aggregation and Disaggregation in Sociological Research. Working Papers in Methodology No. 4. Institute for Research in Social Science, University of North Carolina, Chapel Hill, North Carolina.

Hannan, Michael T.
1971 "Problems of aggregation." Chapter 27 in Hubert M. Blalock, Jr. (ed.), Causal Models in the Social Sciences. Chicago: Aldine-Atherton, Inc.

Hauser, Philip M.
1969 "Comment on Coleman's paper." Pp. 122-128 in Robert Bierstedt (ed.), A Design for Sociology: Scope, Objectives, and Methods. Philadelphia: American Academy of Political and Social Science, Monograph 9 (April).

Heise, David R.
1969 "Problems in path analysis and causal inference." Chapter 2 in Edgar F. Borgatta (ed.), Sociological Methodology 1969. San Francisco: Jossey-Bass Inc.

Hill, Richard J.
1970 "On the relevance of methodology." Chapter 1 in Normal K. Denzin (ed.), Sociological Methods. Chicago: Aldine Publishing Co.

Hirschi, Travis and Hanan C. Selvin
1967 Delinquency Research: An Appraisal of Analytic Methods. New York: The Free Press.

Hirschi, Travis and Hanan C. Selvin
1970 "False criteria of causality in delinquency research." Chapter 15 in Normal K. Denzin (ed.), Sociological Methods. Chicago: Aldine Publishing Co.

Hobert, Robert and Marvin D. Dunnette
1967 "Development of moderator variables to enhance the prediction of managerial effectiveness." Journal of Applied Psychology 51 (February): 50-64.

Homans, George C.
1964a "Contemporary theory in sociology." Pp. 951-971 in R. E. L. Faris (ed.), Handbook of Modern Sociology. Chicago: Rand McNally and Co.

Homans, George C.
1964b "Bringing men back in." American Sociological Review 29 (December): 809-818.

Hovland, Carl I., Irving L. Janis and Harold H. Kelley
1953 Communication and Persuasion. New Haven, Conn.: Yale University Press.

Hyman, Herbert
1955 Survey Design and Analysis. Glencoe, Illinois: The Free Press.

Hyman, Herbert H. and Paul B. Sheastley
1952 "Some reasons why information campaigns fail." Pp. 86-95 in Guy E. Swanson, Theodore M. Newcomb and Eugene L. Hartley (eds.), Readings in Social Psychology. New York: Henry Holt and Co.

Janis, Irving L. and Peter B. Field
1959 "A behavioral assessment of persuasibility, consistency of individual differences." Chapter 2 in Carl I. Hovland and Irving L. Janis (eds.), Personality and Persuasibility. New Haven, Conn.: Yale University Press.

Johnston, J.
1972 Econometric Methods. New York: McGraw-Hill Book Co.

Kaplan, Abraham
1964 The Conduct of Inquiry. San Francisco: Chandler Publishing Co.

Katz, Daniel
1967a "The motivational basis of organizational behavior." Chapter 57 in Edwin P. Hollander and Raymond G. Hunt (eds.), Current Perspectives in Social Psychology. New York: Oxford University Press.

Katz, Daniel
1967b "The practice and potential of survey methods in psychological research." Pp. 145-215 in Charles Y. Glock (ed.), Survey Research in the Social Sciences. New York: Russell Sage Foundation.

Katz, Daniel and Robert Kahn
1966 The Social Psychology of Organizations. New York: John Wiley and Sons, Inc.

Katz, Elihu and Paul F. Lazarsfeld
1955 Personal Influence. New York: The Free Press.

Kelman, Herbert C.
1961 "Processes of opinion change." Public Opinion Quarterly 25 (Spring): 57-78.

Kelman, Herbert C.
1967 "Three processes of social influence." Chapter 45 in Edwin P. Hollander and Raymond G. Hunt (eds.), Current Perspectives in Social Psychology. New York: Oxford University Press.

Kendall, Patricia L. and Paul F. Lazarsfeld
1950 "Problems of survey analysis." Pp. 133-196 in Robert K. Merton and Paul F. Lazarsfeld (eds.), Continuities in Social Research. Glencoe, Illinois: The Free Press.

Kerlinger, Fred N.
1964 Foundations of Behavioral Research. New York: Holt, Rinehart and Winston, Inc.

Klein, Stephen P., Donald A. Rock and Franklin R. Evans
1968 "The use of multiple moderators in academic prediction." Journal of Educational Measurement 5 (Summer): 151-160.

Klonglan, Gerald E., George M. Beal, Joe M. Bohlen and Charles L. Mulford
1966 Prediction of Local Civil Defense Directors' Role Performance: Minnesota, Georgia and Massachusetts. Rural Sociology Report No. 52. Department of Sociology and Anthropology, Iowa State University, Ames, Iowa.

Labovitz, Sanford
1967 "Some observations on measurement and statistics." Social Forces 46 (December): 151-160.

Labovitz, Sanford
1968 "Reply to Champion and Morris." Social Forces 46 (June): 543-544.

Ladinsky, Jack
1967 "Higher education and work achievement among lawyers." Sociological Quarterly 8 (Spring): 222-232.

Land, Kenneth C.
1969 "Principles of path analysis." Chapter 1 in Edgar F. Borgatta (ed.), Sociological Methodology 1969. San Francisco: Jossey-Bass Inc.

Land, Kenneth C.
1972 "Review of causal models in the social sciences." Sociological Methods and Research 1 (August): 139-141.

Lazarsfeld, Paul F.
1958 "Evidence and inference in social research." Daedalus 81 (Fall): 99-130.

Lee, Marilyn C.
1961 "Interactions, configurations and nonadditive models." Educational and Psychological Measurement 21 (Winter): 797-805.

Lee, Motoko
1969 A Study of Managerial Behavior. Ames, Iowa: Iowa State University. Unpublished Ph.D. dissertation.

Lerner, Daniel
1965 "On cause and effect." Pp. 1-10 in Daniel Lerner (ed.), Cause and Effect. New York: The Free Press.

Lionberger, Herbert F.
1960 Adoption of New Ideas and Practices. Ames, Iowa: The Iowa State University Press.

Lippitt, Ronald
1968 "Improving the socialization process." Chapter 8 in John A. Clausen (ed.), Socialization and Society. Boston: Little, Brown and Co.

Litwak, Eugene and Henry J. Meyer
1966 "A balance theory of coordination between bureaucratic organizations and primary reference groups." Administrative Science Quarterly 11 (June): 31-58.

Lyons, Morgan
1971 "Techniques for using ordinal measures in regression and path analysis." Chapter 6 in Herbert L. Costner (ed.), Sociological Methodology 1971. San Francisco: Jossey-Bass Inc.

Martin, H. T. and L. Siegel
1953 "Background factors related to effective group participation." Journal of Abnormal and Social Psychology 48 (October): 599-600.

McKinney, John C.
1967 "Constructive typology: explication of a procedure." Chapter 9 in John T. Doby (ed.), An Introduction to Social Research. New York: Appleton-Century Crofts.

Merton, Robert K.
1967 On Theoretical Sociology. New York: The Free Press.

Merton, Robert K.
1968 Social Theory and Social Structure. New York: The Free Press.

Mueller, John H., Karl F. Schuessler and Herbert L. Costner.
1970 Statistical Reasoning in Sociology. Boston: Houghton Mifflin Co.

Mulford, Charles L., Gerald E. Klonglan and Paul F. Schmitz
1971 Causal Model Analysis of Local Civil Defense Director Coordinator's Building Roles in Horizontal-Vertical Community Systems. Sociology Report No. 93. Department of Sociology and Anthropology, Iowa State University, Ames, Iowa.

Mulford, Charles L., Gerald E. Klonglan, Richard D. Warren and Paul F. Schmitz
1972a "A causal model of effectiveness in organizations." Social Science Research 1 (April): 61-78.

Mulford, Charles L., Gerald E. Klonglan and Richard D. Warren
1972b "Socialization, communication and role performance." Sociological Quarterly 13 (Winter): 74-80.

Nagel, Ernest
1965 "Types of causal explanation in science." Pp. 11-26 in Daniel Lerner (ed.), Cause and Effect. New York: The Free Press.

Nedd, Albert N. B.
1971 "The simultaneous effect of several variables on attitudes toward change." Administrative science Quarterly 16 (June): 258-269.

Nie, Norman, Dale H. Bent and C. Hadlai Hull
1970 Statistical Package for the Social Sciences. New York: McGraw-Hill Book Co.

Nunnally, Jum
1967 Psychometric Theory. New York: McGraw-Hill Book Co.

Ofshe, Richard and Ronald E. Anderson
1969 "Testing a measurement model." Chapter 9 in Edgar F. Borgatta (ed.), Sociological Methodology 1969. San Francisco: Jossey-Bass Inc.

Pasanella, Ann K.
1972 "Moderators, suppressors, and other stratifying devices. Chapter 42 in Paul F. Lazarsfeld, Ann K. Pasanella and Morris Rosenberg (eds.), Continuities in the Language of Social Research. New York: The Free,Press.

Pavalko, Ronald M.
1971 Sociology of Occupations and Professions. Itasca, Illinois: F. E. Peacock Publishers, Inc.

Pervin, Lawrence A.
1968 "Performance and satisfaction as a function of individual-environment fit." Psychological Bulletin 69 (January): 56-68.

Porter, John
1970 "Some observations on comparative studies." Pp. 141-154 in Dennis P. Forcese and Stephen Richer (eds.), Stages of Social Research. Englewood Cliffs, N.J.: Prentice-Hall, Inc.

Price, James L.
1968 Organizational Effectiveness: An Inventory of Propositions. Homewood, Illinois: Richard D. Irwin, Inc.

Rao, Potluri and Roger LeRoy Miller
1971 Applied Econometrics. Belmont, Calif.: Wadsworth Publishing Co., Inc.

Rhoads, John K.
1971 "On causality in social science." Sociological Inquiry 41 (Winter): 27-37.

Rogers, Everett M.
1962 Diffusion of Innovations. New York: The Free Press.

Rogers, Everett M.
1972 "Change agents, clients and change." Chapter 15 in Gerald Zaltman, Philip Kotler and Ira Kaufman (eds.), Creating Social Change. New York: Holt, Rinehart and Winston, Inc.

Rosenberg, Morris
1968 The Logic of Survey Analysis. New York: Basic Books.

Rosenberg, Morris
1972 "Conditional relationships." Chapter 16 in Paul F. Lazarsfeld, Ann K. Pasanella and Morris Rosenberg (eds.), Continuities in the Language of Social Research. New York: The Free Press.

Rosow, Irving
1965 "Forms and functions of adult socialization." Social Forces 44 (September): 35-45.

Ross, Ralph
1962 Symbols and Civilization. New York: Harcourt, Brace and World, Inc.

Rothman, Robert A. and Robert Perrucci
1971 "Vulnerability to knowledge obsolescence among professionals." Sociological Quarterly 12 (Spring): 147-158.

Sample, John and Rex Warland
1973 "Attitude and prediction of behavior." Social Forces 51 (March): 292-304.

Sanford, Fillmore H.
1952 "The followers role in leadership phenomena." Pp. 328-340 in Guy E. Swanson, Theodore M. Newcomb and Eugene L. Hartley (eds.), Readings in Social Psychology. New York: Henry Holt and Co.

Saunders, David R.
1956 "Moderator variables in prediction." Educational and Psychological Measurement 16 (Summer): 209-222.

Schnore, Leo F.
1966 "The rural-urban variable: an urbanite's perspective." Rural Sociology 31 (March): 131-143.

Schoenberg, Ronald
1972 "Strategies for meaningful comparison." Chapter 1 in Herbert L. Costner (ed.), Sociological Methodology 1972. San Francisco: Jossey-Bass Inc.

Schuessler, Karl
1971a Analyzing Social Data. Boston: Houghton Mifflin Co.

Schuessler, Karl
1971b "Continuities in social prediction." Chapter 11 in Herbert L. Costner (ed.), Sociological Methodology 1971. San Francisco: Jossey-Bass Inc.

Selltiz, Claire, Marie Jahoda, Morton Deutsch and Stuart W. Cook
1959 Research Methods in Social Relations. New York: Henry Holt and Co., Inc.

Selvin, Hanan C.
1958 "Durkheim's Suicide and problems of empirical research." American Journal of Sociology 63 (May): 607-619.

Sewell, William H.
1970 "Infant training and the personality of the child." Chapter 52 in Gregory P. Stone and Harvey A. Farberman (eds.), Social Psychology Through Symbolic Interaction. Waltham, Mass.: Ginn-Blaisdell.

Simon, Herberg A.
1954 "Spurious correlation: a causal interpretation." Journal of the American Statistical Association 49 (September): 467-479.

Simon, Herbert A.
1957a Models of Man: Social and Rational. New York: John Wiley and Sons, Inc.

Simon, Herbert A.
1957b Administrative Behavior: A Study of Decision-Making Processes in Administrative Organization. New York: The Free Press.

Sjoberg, Gideon and Roger Nett
1968 A Methodology for Social Research. New York: Harper and Row.

Smelser, Neil J.
1968 Essays in Social Explanation. Englewood Cliffs, N.J.: Prentice-Hall Inc.

Smelser, Neil J.
1969 "The optimum scope of sociology." Pp. 1-21 in Robert Bierstedt (ed.), A Design for Sociology: Scope, Objectives, and Methods. Philadelphia: American Academy of Political and Social Science, Monograph 9 (April).

Smith, David Horton
1966 "A psychological model of individual participation in formal voluntary organizations: application to some Chilean data." American Journal of Sociology 72 (November): 249-266.

Smith, M. Brewster
1968 "Competence and socialization." Chapter 7 in John A. Clausen (ed.), Socialization and Society. Boston: Little, Brown and Co.

Snedecor, George W. and William G. Cochran
1967 Statistical Methods. Ames, Iowa: The Iowa State University Press.

Solomon, Herbert
1961 Studies in Item Analysis and Prediction. Stanford, Calif.: Stanford University Press.

Specht, David A.
1973 "Scale reliability analysis: subprogram reliability." Mimeo., program written by Dr. David A. Specht. Department of Sociology and Anthropology, Iowa State University, Ames, Iowa.

Stevens, S. S.
1967 "On the theory of scales of measurement." Chapter 1 in William A. Mehrens and Robert L. Ebel (eds.), Principles of Educational and Psychological Measurement. Chicago: Rand McNally and Co.

Stinchcombe, Arthur L.
1968 Constructing Social Theories. New York: Harcourt, Brace and World, Inc.

Strauss, George and Leonard R. Sayles
1960 Personnel: The Human Problems of Management. Englewood Cliffs, N.J.: Prentice-Hall, Inc.

Tannenbaum, Arnold S.
1962 "Control in organizations: individual adjustment and organizational performance." Administrative Science Quarterly 7 (September): 236-257.

Tittle, Charles R. and Richard J. Hill
1967 "Attitude measurement and prediction of behavior: an evaluation of conditions and measurement techniques." Sociometry 30 (June): 199-213.

Torgerson, Warren S.
1958 Theory and Methods of Scaling. New York: John Wiley and Sons, Inc.

Trow, Martin
1967 "Survey research and education." Pp. 315-375 in Charles Y. Glock (ed.), Survey Research in the Social Sciences. New York: Russell Sage Foundation.

Tukey, John W.
1954 "Causation, regression and path analysis." Chapter 3 in Oscar Kempthorne (ed.), Statistics and Mathematics in Biology. Ames, Iowa: The Iowa State College Press.

Tully, Joan
1968 "Farmers' problems of behavioral change." Human Relations 21 (November): 373-382.

Upshaw, Harry S.
1968 "Attitude measurement." Chapter 3 in Hubert M. Blalock, Jr. and Ann B. Blalock (eds.), Methodology in Social Research. New York: McGraw-Hill Book Co.

Velicer, Wayne F.
1972a "Comment on the general inapplicability of Ghiselli's moderator system for two predictors." Journal of Applied Psychology 56 (June): 262-265.

Velicer, Wayne F.
1972b "The moderator variable viewed as heterogenous regression." Journal of Applied Psychology 56 (June): 266-269.

Wallace, Walter L.
1971 The Logic of Science in Sociology. Chicago: Aldine-Atherton.

Warren, Richard D., Gerald E. Klonglan and Charles W. Mueller
1968 "Selected approaches to model building and testing in sociology -- discussions and illustrations with emphasis on regression, partial correlation, and path analysis." Mimeo., working draft. Department of Sociology and Anthropology, Iowa State University, Ames, Iowa.

Warren, Richard D., Gerald E. Klonglan and Medhat M. Sabri
1969 The Certainty Method: Its Application and Usefulness in Developing Empirical Measures in Social Sciences. Rural Sociology Report No. 82. Department of Sociology and Anthropology, Iowa State University, Ames, Iowa.

Warren, Richard D., Charles L. Mulford and Judy M. Winklepleck
1973 "Moderator effects on attitude scale construction." (Accepted for publication in Home Economics Research Journal, June, 1973).

Wieland, George F.
1969 "The determinants of clarity in organization goals." Human Relations 22 (April): 161-172.

Williams, Robin M., Jr.
1964 "American society in transition: trends and emerging developments in social and cultural systems." Chapter 1 in James H. Copp (ed.), Our Changing Rural Society: Perspectives and Trends. Ames, Iowa: The Iowa State University Press.

Winer, B. J.
1972 Statistical Principles in Experimental Design. New York: McGraw-Hill Book Co.

Wirth, Louis
1966 'Urbanism as a way of life." Chapter 5 in Roland L. Warren (ed.), Perspectives on the American Community. Chicago: Rand McNally and Co.

Woolridge, Powhatan J.
1971 "Theory, meta-theory, and scientific research." Chapter 4 in Richard O'toole (ed.), The Organization, Management and Tactics of Social Research. Cambridge, Mass.: Schenkman Publishing Co., Inc.

Wright, Sewall
1934 "The method of path coefficient." Annals of Mathematical Statistics 5 (September): 161-215.

Wright, Sewall
1971 "Path coefficients and path regressions: alternative or complementary concepts." Chapter 6 in H. M. Blalock Jr. (ed.), Causal Models in the Social Science. Chicago: Aldine-Atherton, Inc.

Zedeck, Sheldon
1971 "Problems with the use of "moderator" variables." Psychological Bulletin 76 (October): 295-310.

Zetterberg, Hans L.
1966 On Theory and Verification in Sociology. Totowa, N.J.: The Bedminster Press.

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APPENDIX A: SOCIALIZATION

Socialization is measured by the following four items:

Socialization Score Items:

1. How would you describe the amount and adequacy of the "job orientation" that you received from local governing bodies (Mayors, Board of Supervisors, etc.) prior to or right after accepting this position?

2. How about your job orientation from other local civil defense directors in your area of the state?

3. How about your job orientation from state civil defense officers or representatives?

Code (for question 1, 2, and 3):

Code	Responses
0	= Don't know
3	= I received little or no orientation.
6	= I received some (an incomplete orientation).
9	= I received a great deal of orientation.

4. With regard to your knowledge and understanding of your own responsibilities and commitments as a local civil defense director, which statement best describes your present feelings?

Code (for question 4):

Code	Responses
0	= Don't know
0	= I understand no more than I did when I accepted this position.
3	= I understand very little about my role and responsibilities.
6	= I somewhat understand my role and responsibilities.

9 = I thoroughly understand my role and responsibilities.

Total Socialization Score: Sum questions 1 to 4.

Potenital Socialization Score: 0 to 36.

Table 37. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite socialization scale for total research sample (N=240)

Scale Item	Inter-item Correlation Coefficients				Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-				.306	3.74	1.58
2	.245**	-			.438	6.84	2.28
3	.282**	.227**	-		.244	5.20	2.17
4	.095	.381**	.027	-	.252	7.22	1.98

**Significant at .01 level.

Table 38. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite socialization scale for educational subgroup with 12 or less years of formal education (n_1=123)

Scale Item	Inter-item Correlation Coefficients				Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-				.415	3.76	1.70
2	.359**	-			.481	6.66	2.32
3	.385**	.224*	-		.272	5.29	2.17
4	.119	.387**	.033	-	.256	6.95	2.25

*Significant at .05 level.

**Significant at .01 level.

Table 39. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite socialization scale for education subgroup with more than 12 years of formal education (n_2=117)

Scale Item	Inter-item Correlation Coefficients				Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-				.162	3.72	1.45
2	.106	-			.380	7.02	2.23
3	.157	.240**	-		.226	5.10	2.17
4	.082	.364**	.037	-	.247	7.51	1.61

**Significant at .01 level.

Table 40. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite socialization scale for rural subgroup (n_1=88)

Scale Item	Inter-item Correlation Coefficients				Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-				.400	3.54	1.40
2	.337**	-			.464	5.83	2.38
3	.229*	.231*	-		.227	5.04	1.96
4	.263*	.371*	.068	-	.334	6.41	2.19

*Significant at .05 level.

**Significant at .01 level.

Table 41. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite socialization scale for urban subgroup (n_2=152)

Scale Item	Inter-item Correlation Coefficients				Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-				.239	3.85	1.67
2	.171*	-			.341	7.42	2.01
3	.300**	.221**	-		.258	5.29	2.28
4	.049	.251**	-.025	-	.087	7.70	1.68

*Significant at .05 level.

**Significant at .01 level.

Table 42. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite socialization scale part-time subgroup (n_1=169)

Scale Item	Inter-item Correlation Coefficients				Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-				.349	3.66	1.48
2	.281**	-			.444	6.57	2.31
3	.278**	.209**	-		.266	4.99	2.14
4	.176*	.427**	.130	-	.362	7.01	1.96

*Significant at .05 level.

**Significant at .01 level.

Table 43. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite socialization scale for full-time subgroup (n_2=71)

Scale Item	Inter-item Correlation Coefficients				Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-				.186	3.93	1.80
2	.142	-			.331	7.48	2.08
3	.270*	.213	-		.093	5.70	2.16
4	-.099	.184	-.305**	-	-.109	7.73	1.94

*Significant at .05 level.

**Significant at .01 level.

Table 44. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite socialization scale for localite subgroup (n_1=132)

Scale Item	Inter-item Correlation Coefficients				Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-				.408	3.66	1.54
2	.338**	-			.445	6.25	2.32
3	.318**	.189*	-		.241	5.07	2.10
4	.185*	.383**	.066	-	.305	6.75	2.11

*Significant at .05 level.

**Significant at .01 level.

Table 45. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite socialization scale for cosmopolite subgroup (n_2=108)

Scale Item	Inter-item Correlation Coefficients				Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-				.169	3.83	1.63
2	.113	-			.341	7.55	2.03
3	.238*	.257**	-		.234	5.36	2.25
4	-.065	.235*	-.072	-	.051	7.80	1.64

*Significant at .05 level.

**Significant at .01 level.

APPENDIX B: COMMUNICATION

Communication scores are based on a weighting procedure which considers the frequency of and most typical methods of communication between the local civil defense directors and members of the state civil defense staff. The questions and scoring procedures used in assigning communication scores to the individual LCDC's are presented below.

PART ONE: typical method of communication

1. First indicate the most typical or most usual type of communication between you and the state civil defense staff members.

   a. By two way oral in a face to face situation.
   b. By telephone.
   c. By tape recording, public address system, motion picture, etc.
   d. By letter.
   e. By one way written memo, brochure, etc.

Code	Response
0	= Never used as a source.
1	= Fifth most typical method of communication.
2	= Fourth most typical method of communication.
3	= Third most typical method of communication.
4	= Second most typical method of communication.
5	= First most typical method of communication.

The five methods of communication are assigned weights from 1 to 5 depending on how personal they are. "Two-way oral" is assigned a weight of 5 as it is the most personal while "memos," "brochures," etc. in being the least personal are assigned weights of 1. Since the scoring procedure is a function of two criteria - "personal" and "typicality" -

individual scores are determined from the following matrix.

Method of Communication	Communication "Personal" Weight	How "Typical" Weight: Never Used 0	5th 1	4th 2	3rd 3	2nd 4	1st 5
a. Two-way oral in a face to face situation	5	0	5	10	15	20	25
b. By telephone	4	0	4	8	12	16	20
c. By tape recording, public address system, motion pictures, etc.	3	0	3	6	9	12	15
d. By letter	2	0	2	4	6	8	10
e. By one-way written memo, brochure, etc.	1	0	1	2	3	4	5

The total score in Part One for each local director is determined by summing the points in the cells obtained by multiplying the "personal" weight by the "typical" weight. The maximum points for a respondent is 55 by summing the diagonal cells beginning in the upper right hand corner; that is, 25, 16, 9, 4 and 1. The minimum score is 0 indicating that no communication method is utilized.

PART TWO: Frequency of communication with state staff

2. For each of these methods of communication record the frequency of communication.

   a. By two-way oral in a face to face situation.
   b. By telephone.
   c. By tape recording, public address system, motion pictures, etc.
   d. By letter.
   e. By one-way written memo, brochure, etc.

Code

0 = Never used as method of communication.
3 = Seldom used as method of communication.
6 = Often used as method of communication.

The five methods of communication are assigned weights from 1 to 5 in accordance with how personal they are with the communication score in Part Two being determined from the following communication matrix in relating the "personal" and "frequency of use" weights.

Method of Communication	Communication "Personal" Weight	"Frequency of use" Weight		
		0	3	6
a. Two-way oral in face to face situation	5	0	15	30
b. By telephone	4	0	12	24
c. By tape recording, public address system, motion pictures, etc.	3	0	9	18
d. By letter	2	0	6	12
e. By one-way written memo, brochure, etc.	1	0	3	6

The communication score for each individual in Part Two is determined by summing the cell points obtained by multiplying the "personal" weight by the "frequency of use" weight. The potential scores obtainable range from 0 to 90 which respectively indicate no utilization of the communication methods or a frequent use of all methods of communication. In the latter situation the maximum possible is obtained by summing the right hand column; that is, 30, 24, 18, 12 and 6.

Total communication score: Sum Part One and Part Two

Total potential communication score: 0 to 145

APPENDIX C: RECRUITMENT SELECTIVITY

Recruitment selectivity scores for each local civil defense director are determined from the response to the following two questions.

1. About how many people other than yourself were interested in obtaining this position?

Code	Response
0	= Don't know
1	= None
2	= A few
3	= Several
4	= Many

2. Some people use the term "selectivity" to mean care, consideration, etc., in hiring or appointing people to positions. About how much "selectivity" do you feel was used in choosing you for this position?

Code	Response
0	= Don't know
1	= None
2	= Some
3	= Much

Total Selectivity Score: Sum questions 1 and 2

Potential Selectivity Score: 0 to 7

APPENDIX D: SCOPE

The empirical measure of scope is obtained from the five items below:

1. We are interested in the frequency of your personal contact that relates to civil defense. With reference to the categories below, please indicate if the following contacts are made 1) never, 2) seldom, 3) sometimes, or 4) very often.

   a. Talk about civil defense with your friends.

   b. Gather socially with others who work in civil defense.

   c. Call on people outside of civil defense to help with civil defense.

   d. Seek to coordinate civil defense activities among other government agencies.

Code	Response
0	= Never
1	= Seldom
2	= Sometimes
3	= Very often

Score item 1: Sum parts a, b, c, and d.

2. a. Does your municipal or county civil defense organization hold regular meetings?

Code	Response
0	= No
1	= Yes
0	= No municipal or county civil defense organization in area.

b. How good is attendance?

Code Response

0 = Does not apply, responded no on part 2a.
1 = Poor
1 = Fair
2 = Good
2 = Very good

Score item 2: Sum parts a and b.

3. Have you ever worked with other civil defense directors outside of your local civil defense area? How many different county and city civil defense directors outside your own local civil defense area have you worked with directly?

Code Response

0 = No other directors
1 = 1 to 3 other directors
2 = 4 to 9 other directors
3 = 10 or more other directors

4. In your opinion is the idea of a state-wide civil defense directors association desirable?

Code Response

0 = Undesirable
1 = Uncertain or don't know
2 = Desirable

5. Do you think the regular use (not emergency use) of any of the items listed below would be an asset to local civil defense organizations?

a. Complete uniforms
b. An official civil defense badge
c. An armband insignia
d. Side arms or other weapons
e. Helmets with insignia
f. Rank chevrons or dress lapel pins to indicate rank
g. Civil defense medals

Code	Response
0	= None
1	= 1 to 2 items
2	= 2 to 4 items
3	= 5 to 7 items

Total Scope Score: Sum items 1 to 5

Potential Scope Score: 0 to 23

Table 46. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite measure of scope for total research sample (N=240)

Scale Item	Inter-item Correlation Coefficients					Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-					.549***	8.13	2.78
2	.164*	-				.186	2.51	1.00
3	.435**	.151*	-			.433	1.32	1.05
4	.442**	.061	.271**	-		.386	1.32	1.05
5	.201**	.117	.081	-.009	-	.171	1.59	1.08

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .4484.

Table 47. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite measure of scope for educational subgroup with 12 or less years of formal education (n_1=123)

Scale Item	Inter-item Correlation Coefficients				Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-				.551***	8.16	2.89
2	.163	-			.250	2.66	0.85
3	.432**	.297**	-		.481***	1.16	1.03
4	.461	.143	.288**	-	.423	0.85	1.20
5	.258**	.172	.173	.008 -	.243	1.67	1.03

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .4484.

Table 48. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite measure of scope for educational subgroup with more than 12 years of formal education (n_2= 117)

Scale Item	Inter-item Correlation Coefficients				Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-				.549***	8.09	2.66
2	.170	-			.156	2.35	1.12
3	.456**	.089	-		.401	1.49	1.05
4	.436**	.040	.222*	-	.364	1.20	1.28
5	.142	.060	.020	-.004 -	.107	1.50	1.13

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .4484.

Table 49. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite measure of scope for rural subgroup (n_1=88)

Scale Item	Inter-item Correlation Coefficients					Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-					.532***	6.52	3.05
2	.040	-				.009	2.33	1.10
3	.313**	-.041	-			.299	0.84	0.87
4	.486**	-.014	.116	-		.416	0.60	1.08
5	.331**	-.031	.238*	.127	-	.313	1.59	1.07

*Significant at .05 level.
**Significant at .01 level.
***Exceeds minimum item-total criterion $1/\sqrt{k}$=.4484.

Table 50. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite item measure of scope for urban subgroup (n_2=152)

Scale Item	Inter-item Correlation Coefficients					Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-					.458***	9.06	2.11
2	.191*	-				.254	2.62	0.93
3	.369**	.198*	-			.374	1.60	1.05
4	.328**	.051	.235**	-		.267	1.26	1.28
5	.143	.219*	.015	-.074	-	.116	1.59	1.09

*Significant at .05 level.
**Significant at .01 level.
***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .4484.

Table 51. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite measure of scope for part-time subgroup (n_1=169)

Scale Item	Inter-item Correlation Coefficients					Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-					.480***	7.65	2.74
2	.067	-				.129	2.46	1.05
3	.360**	.110	-			.366	1.23	1.03
4	.455**	.081	.220**	-		.390	0.92	1.23
5	.187*	.140	.097	-.036	-	.170	1.55	1.10

*Significant at .05 level.
**Significant at .01 level.
***Exceeds minimum item-total criterion $1\sqrt{k}$ = .4484.

Table 52. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite measure of scope for full-time subgroup (n_2=71)

Scale Item	Inter-item Correlation Coefficients					Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-					.658**	9.27	2.53
2	.402**	-				.300	2.63	0.88
3	.563**	.232*	-			.535***	1.55	1.07
4	.357**	-.026	.342**	-		.321	1.27	1.27
5	.206	.030	.014	.031	-	.141	1.69	1.04

*Significant at .05 level.
**Significant at .01 level.
***Exceeds minimum item-total criterion $1\sqrt{k}$ = .4484.

Table 53. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite measure of scope for localite subgroup (n_1=132)

Scale Item	Inter-item Correlation Coefficients					Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-					.480***	7.47	2.89
2	.099	-				.155	2.51	0.98
3	.333**	.153	-			.368	1.07	1.01
4	.445**	.127	.192*	-		.403	0.71	1.14
5	.226**	.085	.180*	.017	-	.220	1.65	1.07

*Significant at .05 level.
**Significant at .01 level.
***Exceeds minimum item-total criterion $1\sqrt{k}$ = .4484.

Table 54. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite measure of scope for cosmopolite subgroup (n_2=108)

Scale Item	Inter-item Correlation Coefficients					Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-					.589***	8.93	2.40
2	.274**	-				.248	2.51	1.03
3	.485**	.162	-			.429	1.63	1.03
4	.349**	.001	.238*	-		.282	1.40	1.29
5	.227*	.154	.006	-.002	-	.174	1.52	1.09

*Significant at .05 level.
**Significant at .01 level.
***Exceeds minimum item-total criterion $1\sqrt{k}$ = .4484.

APPENDIX E: PERVASIVENESS

The following multi-item question is used in obtaining pervasiveness scores for the local civil defense directors.

In your home do you have the following:

1. A family shelter area.
2. Provisions for emergency heating.
3. Provisions for emergency lighting.
4. An emergency water supply.
5. Emergency fire-fighting equipment.
6. Provisions for a two-week supply of food.
7. A battery-powered radio.
9. A first-aid kit.
10. Emergency blankets and clothing.

Code Response for each item

0 = No

1 = Yes

Total Pervasiveness Score: Sum parts 1 to 10.

Potential Pervasiveness Score: 0 to 10.

Table 55. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite pervasiveness scale for total research sample (N=240)

Scale Item	Inter-item Correlation Coefficients									Corrected Item-total Correlation	Item Means	Item Standard Deviations
1	-									.555***	0.47	0.50
2	.330**	-								.617***	0.45	0.50
3	.475**	.566**	-							.696***	0.55	0.50
4	.485**	.411**	.475**	-						.700***	0.59	0.49
5	.369**	.489**	.449**	.435**	-					.614**	0.52	0.50
6	.435**	.646**	.620**	.549**	.559**	-				.768***	0.56	0.50
7	.465**	.408**	.510**	.673**	.333**	.549**	-			.682***	0.58	0.49
8	.418**	.455**	.507**	.573**	.476**	.633**	.505**	-		.731**	0.67	0.47
9	.434**	.458**	.588**	.632**	.579**	.624**	.619**	.750**	-	.799**	0.70	0.46
10	.484**	.525**	.603**	.593**	.593**	.622**	.654**	.713**	.762** -	.817***	0.69	0.46

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3164.

Table 56. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite pervasiveness scale for educational subgroup with 12 or less years of formal education (n_1=123)

Scale Item	Inter-item Correlation Coefficients									Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-									.448***	0.34	0.48
2	.232**	-								.605***	0.39	0.49
3	.417**	.601**	-							.704***	0.52	0.50
4	.382**	.401**	.446**	-						.676***	0.52	0.50
5	.280**	.440**	.497**	.464**	-					.621***	0.49	0.50
6	.382**	.635**	.642**	.511**	.594**	-				.776***	0.52	0.50
7	.405**	.455**	.495**	.625**	.253**	.527**	-			.648***	0.53	0.50
8	.298**	.435**	.487**	.555**	.551**	.656**	.466**	-		.736***	0.63	0.48
9	.353**	.413**	.584**	.619**	.584**	.619**	.561**	.770**	-	.786***	0.67	0.47
10	.364**	.495**	.564**	.564**	.563**	.598**	.610**	.716**	.724**	- .781***	0.67	0.47

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3164.

Table 57. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite pervasiveness scale for educational subgroup with more than 12 years of formal education (n_2=117)

Scale Item	Inter-item Correlation Coefficients										Corrected Item-total Correlation	Item Means	Item Standard Deviations
1	-										.654**	0.61	0.49
2	.389**	-									.617***	0.51	0.50
3	.540**	.524**	-								.688***	0.58	0.49
4	.559**	.399**	.502**	-							.714***	0.67	0.47
5	.466**	.538**	.396**	.400**	-						.608***	0.54	0.50
6	.479**	.651**	.593**	.581**	.518**	-					.757***	0.61	0.49
7	.507**	.340**	.520**	.718**	.415**	.565**	-				.708***	0.64	0.48
8	.539**	.468**	.525**	.586**	.389**	.602**	.541**	-			.724***	0.71	0.46
9	.521**	.500**	.589**	.644**	.571**	.627**	.681**	.725**	-		.817***	0.73	0.44
10	.618**	.553**	.645**	.624**	.624**	.644**	.700**	.705**	.805**	-	.860***	0.73	0.45

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3164.

Table 58. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite pervasiveness scale for rural subgroup (n_1=88)

Scale Item	Inter-item Correlation Coefficients									Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-									.587***	0.40	0.49
2	.363**	-								.683***	0.41	0.49
3	.504**	.577**	-							.690***	0.41	0.49
4	.544**	.517**	.517**	-						.779***	0.52	0.50
5	.363**	.389**	.342**	.564**	-					.578***	0.41	0.49
6	.510**	.674**	.628**	.557**	.441**	-				.772***	0.43	0.49
7	.478**	.593**	.639**	.685**	.362**	.591**	-			.750***	0.48	0.50
8	.480**	.592**	.499**	.704**	.545**	.722**	.528**	-		.796***	0.53	0.50
9	.504**	.568**	.568**	.753**	.662**	.696**	.676**	.820**	-	.860***	0.58	0.50
10	.521**	.632**	.679**	.683**	.539**	.667**	.787**	.749**	.791** -	.861***	0.57	0.50

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3164.

Table 59. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite pervasiveness scale for urban subgroup (n_2=152)

Scale Item	Inter-item Correlation Coefficients									Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-									.523***	0.52	0.50
2	.305**	-								.583**	0.47	0.50
3	.440**	.561**	-							.678***	0.63	0.48
4	.440**	.342**	.434**	-						.644***	0.63	0.48
5	.354**	.542**	.481**	.343**	-					.618***	0.58	0.49
6	.372**	.632**	.588**	.532**	.606**	-				.750***	0.64	0.48
7	.442**	.291**	.402**	.658**	.286**	.499**	-			.618***	0.64	0.48
8	.357**	.365**	.472**	.472**	.400**	.545**	.460**	-		.659***	0.75	0.43
9	.369**	.383**	.572**	.539**	.501**	.548**	.558**	.674**	-	.737***	0.78	0.42
10	.444**	.456**	.522**	.522**	.610**	.564**	.541**	.659**	.719**	- .768***	0.77	0.42

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3164.

Table 60. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite pervasiveness scale for part-time subgroup (n_1=169)

Scale Item	Inter-item Correlation Coefficients									Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-									.630***	0.47	0.50
2	.420**	-								.610***	0.38	0.49
3	.525**	.517**	-							.697***	0.47	0.50
4	.558**	.430**	.487**	-						.714***	0.54	0.50
5	.407**	.493**	.430**	.463**	-					.626***	0.47	0.50
6	.506**	.637**	.649**	.549**	.601**	-				.790***	0.52	0.50
7	.497**	.439**	.545**	.654**	.355**	.609**	-			.703***	0.54	0.50
8	.495**	.451**	.570**	.626**	.520**	.639**	.542**	-		.770**	0.65	0.48
9	.495**	.426**	.570**	.651**	.570**	.639**	.642**	.766**	-	.794***	0.65	0.48
10	.555**	.510**	.004**	.587**	.604**	.649**	.652**	.754**	.754**	- .820***	0.64	0.48

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3164.

Table 61. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite pervasiveness scale for full-time subgroup (n_2=71)

Scale Item	Inter-item Correlation Coefficients									Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-									.392***	0.48	0.50
2	.139	-								.594***	0.60	0.49
3	.388**	.619**	-							.646***	0.73	0.44
4	.312**	.298*	.375**	-						.625***	0.70	0.46
5	.286*	.436**	.444**	.319**	-					.547***	0.62	0.49
6	.268*	.642**	.510**	.515**	.421**	-				.690***	0.66	0.48
7	.398**	.269**	.352**	.700**	.228	.358**	-			.588***	0.69	0.46
8	.224	.456**	.329**	.417**	.348**	.611**	.393**	-		.629***	0.72	0.45
9	.281*	.482**	.576**	.531**	.576**	.551**	.510**	.720**	-	.788***	0.83	0.38
10	.308**	.512**	.536**	.571**	.529**	.508**	.628**	.594**	.758**	- .781***	0.82	0.39

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3164.

Table 62. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite pervasiveness scale for localite subgroup (n_1=132)

Scale Item	Inter-item Correlation Coefficients									Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-									.532***	0.38	0.49
2	.292**	-								.591***	0.38	0.49
3	.429**	.554**	-							.674***	0.46	0.50
4	.476**	.414**	.415**	-						.690***	0.51	0.50
5	.322**	.385**	.434**	.490**	-					.589***	0.45	0.50
6	.449**	.605**	.638**	.501**	.531**	-				.777***	0.49	0.50
7	.437**	.437**	.503**	.606**	.274**	.561**	-			.661***	0.50	0.50
8	.406**	.471**	.501**	.604**	.512**	.663**	.486**	-		.765***	0.63	0.48
9	.440**	.440**	.561**	.658**	.572**	.657**	.604**	.787**	-	.816***	0.65	0.48
10	.460**	.493**	.584**	.559**	.563**	.650**	.630**	.756**	.769** -	.812***	0.64	0.48

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3164.

Table 63. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite pervasiveness scale for cosmopolite subgroup (n_2=108)

Scale Item	Inter-item Correlation Coefficients									Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-									.540***	0.59	0.49
2	.326**	-								.623***	0.54	0.50
3	.473**	.547**	-							.691***	0.67	0.47
4	.452**	.370**	.510**	-						.687***	0.68	0.47
5	.386**	.591**	.432**	.331**	-					.624***	0.59	0.49
6	.376**	.677**	.567**	.586**	.573**	-				.740***	0.65	0.48
7	.452**	.330**	.468**	.742**	.371**	.502**	-			.680***	0.68	0.47
8	.411**	.419**	.498**	.514**	.411**	.582**	.514**	-		.683***	0.72	0.45
9	.394**	.459**	.605**	.573**	.572**	.561**	.621**	.689**	-	.771***	0.77	0.42
10	.483**	.547**	.605**	.621**	.617**	.561**	.668**	.640**	.740**	- .817***	0.77	0.42

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3164.

APPENDIX F: SALIENCE

The following sixteen statements are used in obtaining scores in operationalizing the concept of salience

Here are a number of different statements concerning civil defense about which people have different opinions. We would like your opinion of each of the following statements.

1.[1] Civil defense is like insurance in that you don't know if you'll ever need it, but if you do, it sure is good to have it around.

2. Civil defense measures we are taking today cannot be effective long enough to justify the cost; that is, they will soon be obsolete.

3. Civil defense activities are nothing but a waste of money and human energy that could better be spent on waging peace, such as disarmament talks.

4. Civil defense should be abandoned because even if civil defense measures were effective in saving lives, a thermonuclear war would make living on earth impossible for the survivors.

5. The civil defense effort is an admission that war is inevitable.

6. A civil defense program will lead to "preventive war" by the United States, because by attacking first we can hold our casualities down.

7.[1] The civil defense effort is not a sign of war hysteria and militarism.

8. Civil defense activities should be handled by the National Guard or by the army reserves.

9.[1] Civil defense in the United States has been too neglected.

---

[1]Favorable statements.

10. If the Russians fear that our civil defense preparations will increase the likelihood of our striking them in a crisis, they will become trigger happy and attack us.

11. There can be no adequate defense against thermonuclear war.

12.[1] Most critics of civil defense do not want to consider the possibility of a nuclear war being fought.

13. A civil defense program will give our leaders a sense of false security in regard to the potential damages of a thermonuclear attack.

14.[1] The civil defense effort is a defensive measure rather than an offensive measure.

15. The civil defense program is creating a false sense of security among the people.

16. A thermonuclear war would mean the end of democracy as a political system.

Each item was scored separately by the coding schedule below.

Code for Unfavorable Statements	Code for Favorable Statements
00 = Agree, Certainty 5	00 = Disagree, Certainty 5
03 = Agree, Certainty 4	03 = Disagree, Certainty 4
05 = Agree, Certainty 3	05 = Disagree, Certainty 3
06 = Agree, Certainty 2	06 = Disagree, Certainty 2
17 = Agree, Certainty 1	07 = Disagree, Certainty 1
08 = Uncertain or don't know	08 = Uncertain or don't know
09 - Disagree, Certainty 1	09 = Agree, certainty 1
10 = Disagree, Certainty 2	10 = Agree, Certainty 2
11 = Disagree, Certainty 3	11 = Agree, Certainty 3
13 = Disagree, Certainty 4	13 = Agree, Certainty 4
16 = Disagree, Certainty 5	16 = Agree, Certainty 5

Total Salience Score: Sum items 1 to 16.

Potential Salience Score: 0 to 256.

[1]Favorable Statements.

Table 64. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite salience scale for total research sample (N=240)

Scale Item	Inter-item Correlation Coefficients								
1	-								
2	.177*	-							
3	.240**	.102	-						
4	.213**	.338**	.084	-					
5	.055	.097	.153*	.266**	-				
6	.256**	.263**	.121	.331**	.324**	-			
7	.129	.159*	.100	.336**	.220**	.395**	-		
8	.136	.136	.112	.265**	.146*	.300**	.264**	-	
9	.107	.037	.039	.009	.0238	.147*	.070	.113	-
10	.182**	.210**	.296**	.338**	.172*	.394**	.101	.256**	-.075
11	.121	.152*	.157*	.273**	.397**	.288**	.215**	.225**	-.023
12	.088	.137	.050	.586**	.258**	.234**	.442**	.244**	.076
13	.081	.120	.054	.270**	.248**	.232**	.222**	.100	.093
14	.034	.109	.108	.350**	.176*	.238**	.330**	.054	.054
15	.132	.054	.162*	.234**	.083	.226**	.351**	.101	.207**
16	.131	.055	.055	.205**	.275**	.377**	.306**	.257**	-.017

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .2500.

Inter-item Correlation Coefficients						Corrected Item-total Correlations	Item Means	Item Standard Deviations
						.269***	15.15	2.08
						.271***	12.63	4.38
						.241	14.00	3.75
						.548***	14.72	2.56
						.391***	11.14	5.14
						.564***	14.40	2.66
						.466***	14.03	2.67
						.397***	13.84	3.84
						.104	11.24	5.01
-						.389***	14.40	3.36
.251**	-					.417***	11.97	4.73
.245**	.104	-				.460***	14.50	2.67
.058	.217**	.329**	-			.402***	13.46	3.88
.272**	.120	.291**	.332**	-		.389***	12.79	45.6
.065	.221**	.220**	.296**	.154*	-	.364***	13.54	3.57
.219**	.340**	.216**	.295**	.153*	.259**	-.424***	13.60	3.41

Table 65. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite salience scale for educational subgroup with 12 or less years of formal education (n_1=123)

Scale Item	Inter-item Correlation Coefficients								
1	-								
2	.232**	-							
3	.126	.028	-						
4	.066	.382**	-.009	-					
5	-.067	-.005	.115	.192*	-				
6	.237**	.311**	.128	.254**	.273**	-			
7	.062	.155	.094	.281**	.156	.405**	-		
8	.076	.166	.151	.136	.098	.393**	.180*	-	
9	.102	-.006	.191*	-.034	.024	.089	.008	.160	-
10	.064	.167	.051	.340**	.100	.453**	.075	.248**	-.115
11	.054	.176*	.179*	.215*	.295**	.265**	.266**	.129	-.111
12	.057	.160	.001	.617**	.256**	.226*	.356**	.156	.052
13	.051	.171	-.044	.286**	.209*	.229**	.194*	.025	.087
14	-.086	.132	.049	.394**	.100	.214*	.154	.353**	-.004
15	.026	.068	.144	.140	.020	.190*	.246**	.039	.314
16	.089	.180*	.120	.215*	.181*	.442**	.409**	.409**	.047

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .2500.

Inter-item Correlation Coefficients							Corrected Item-total Correlations	Item Means	Item Standard Deviations
							.140	15.20	2.26
							.296***	12.46	4.77
							.192	14.17	3.36
							.499***	14.49	2.92
							.270***	10.56	5.31
							.588***	14.04	2.96
							.418***	13.75	2.94
							.358***	13.58	4.02
							.100	10.84	5.06
-							.326***	14.46	3.42
.199*	-						.348***	11.78	4.90
.295**	.070	-					.480***	14.29	2.92
.007	.217*	.382**	-				.388***	13.01	4.34
.339**	.063	.371**	.244**	-			.364***	11.89	4.94
.013	.130	.138	.326**	.135	-		.325***	13.24	3.90
.222*	.372**	.259**	.318**	.187*	.379**	-	.528***	13.39	3.26

Table 66. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite salience scale for educational subgroup with more than 12 years of formal education (n_2=117)

Scale Item	Inter-item Correlation Coefficients								
1	-								
2	.095	-							
3	.364**	.187**	-						
4	.479**	.258**	.211*	-					
5	.230**	.228**	.204*	.366**	-				
6	.304**	.176*	.138	.453**	.377**	-			
7	.245**	.157	.125	.419**	.289**	.353**	-		
8	.226**	.088	.086	.464**	.190*	.141	.374**	-	
9	.121	.087	-.086	.052	.014	.207*	.134	.046	-
10	.337**	.272**	.516**	.352**	.264**	.333**	.144	.270**	-.028
11	.214*	.117	.144	.361**	.517**	.320**	.137	.340**	.070
12	.144	.094	.112	.521**	.246**	.224*	.570**	.360**	.094
13	.143	.025	.183*	.215*	.282**	.199*	.242**	.197*	.080
14	.239**	.056	.203*	.239**	.238**	.221*	.317**	.280**	.095
15	.302**	.024	.198*	.386**	.149	.261**	.505**	.177*	.054
16	.187*	-.003	.011	.190*	.564**	.297**	.181*	.288**	.091

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .2500.

Inter-item Correlation Coefficients							Corrected Item-total Correlations	Item Means	Item Standard Deviations
							.460***	15.09	1.89
							.235	12.81	3.94
							.312**	13.82	4.13
							.620***	14.96	2.12
							.517***	11.74	4.92
							.517***	14.79	2.26
							.516***	14.33	2.34
							.433***	14.13	3.62
							.086	11.67	4.94
-							.479***	14.34	3.31
.315**	-						.498***	12.18	4.57
.186*	.145	-					.426***	14.72	2.38
.137	.211*	.224*	-				.403***	13.94	3.29
.205*	.187*	.137	.442**	-			.391***	13.73	3.93
.175*	.343**	.335**	.226*	.385**	-		.400***	13.86	3.17
.221*	.305**	.161	.265**	.094	.114	-	.322***	13.83	3.56

Table 67. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite salience scale for composite salience scale for rural subgroup (n_1= 88)

Scale Item	Inter-item Correlation Coefficients								
1	-								
2	.125	-							
3	.390**	.152	-						
4	.283**	.358**	.030	-					
5	.125	.182	.040	.345**	-				
6	.268**	.378**	.125	.354**	.291**	-			
7	.198	..45	.137	.435**	.305**	.289**	-		
8	.076	.177	.117	.298**	.109	.177	.099	-	
9	.016	.002	-.010	-.050	-.130	-.040	.003	-.006	-
10	.308**	.265**	.208**	.220*	.208*	.598**	.046	.263*	-.090
11	.224*	.371**	.120	.291**	.218*	.272**	.224*	.276**	-.112
12	.130	.084	.052	.468**	.322**	.124	.533**	.258*	.043
13	.169	.099	.063	.151	.191	.196	.210*	-.018	.013
14	.053	.118	.074	.194	.210*	.352**	.192	.214*	-.092
15	.270**	.080	.136	.351**	.056	.211*	.398**	-.002	.183
16	.221*	.187	.046	.249*	.150	.388**	.193	.078	-.070

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .2500.

Inter-item Correlation Coefficients						Corrected Item-total Correlations	Item Means	Item Standard Deviations
						.385***	15.01	1.99
						.385***	11.87	4.43
						.215	13.83	3.30
						.555***	14.20	2.58
						.346***	10.58	4.87
						.573***	13.78	3.23
						.458***	13.34	2.81
						.290***	12.84	4.55
						-.056	10.90	4.75
-						.406***	13.81	3.86
.292**	-					.411***	11.20	4.86
.127	.078	-				.394***	14.14	2.74
-.004	.154	.155	-			.313***	12.84	4.09
.187	-.008	.154	.306**	-		.309***	12.59	4.20
.066	.260*	.274**	.332**	.124	-	.405***	12.79	3.79
.250*	.289**	.120	.282**	.189	.344**	- .403***	12.69	3.53

Table 68. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite salience scale for composite salience scale for urban subgroup (n_2 = 152)

Scale Item	Inter-item Correlation Coefficients								
1	-								
2	.197*	-							
3	.172*	.073	-						
4	.166*	.305**	.104	-					
5	.015	.035	.200*	.210*	-				
6	.249**	.137	.119	.285**	.349**	-			
7	.076	.132	.075	.237**	.152	.459**	-		
8	.173*	.061	.108	.201*	.155	.388**	.359**	-	
9	.149	.047	.058	.028	.099	.286**	.095	.191*	-
10	.091	.145	.358**	.408**	.136	.143	.102	.208**	-.080
11	.054	-.007	.172*	.239**	.489**	.280**	.178*	.149	.016
12	.058	.150	.045	.650**	.212**	.310**	.365**	.209**	.086
13	.021	.110	.045	.324**	.270**	.237**	.198*	.164*	.130
14	.022	.099	.121	.431**	.156	.163*	.254**	.428**	.119
15	.039	.003	.173*	.125	.080	.199*	.281**	.141	.214**
16	.067	-.002	.052	.135	.332**	.329**	.336**	.359	-.004

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .2500.

Inter-item Correlation Coefficients							Corrected Item-total Correlations	Item Means	Item Standard Deviations
							.200	15.23	2.14
							.169	13.07	4.30
							.254***	14.10	4.00
							.519***	15.02	2.51
							.407***	11.46	5.28
							.540***	14.76	2.20
							.429***	14.43	2.51
							.441***	14.43	3.23
							.181	11.45	5.15
-							.349***	14.75	2.99
.199*	-						.397***	12.42	4.62
.320**	.101	-					.487***	14.71	2.62
.080	.239**	.430**	-				.435***	13.82	3.72
.331**	.184*	.363**	.347**	-			.443***	12.90	4.76
.026	.169*	.161*	.247**	.167*	-		.298***	13.98	3.37
.156	.347**	.252**	.275**	.129	.156	-	.390***	14.13	3.24

Table 69. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite salience scale for composite salience scale for part-time subgroup (n_1=169)

Scale Item	Inter-item Correlation Coefficients								
1	-								
2	.103	-							
3	.218**	.071	-						
4	.189*	.247**	.116	-					
5	.039	.028	.205**	.185*	-				
6	.222**	.240**	.109	.318**	.300**	-			
7	.139	.153	.081	.388**	.153	.449**	-		
8	.152	.174*	.144	.353**	.144	.251**	.297**	-	
9	.122	.051	.075	-.003	-.039	.126	.034	.053	-
10	.121	.215**	.388**	.374**	.166*	.272**	.075	.153	-.093
11	.079	.113	.152	.178*	.350**	.317**	.203*	.190*	-.028
12	.098	.143	.070	.617**	.162*	.191*	.403**	.267**	.002
13	.086	.098	.065	.176*	.226**	.251**	.201*	.099	.048
14	.074	.090	.099	.372**	.106	.185*	.298**	.387**	.002
15	.136	.034	.196	.240**	-.008	.219**	.313**	.120	.200*
16	.121	.166*	.031	.231**	.296**	.445**	.343**	.271*	-.078

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .2500.

Inter-item Correlation Coefficients							Corrected Item-total Correlations	Item Means	Item Standard Deviations
							.252***	14.96	2.30
							.243	12.25	4.48
							.280***	13.95	3.86
							.531***	14.58	2.52
							.317***	10.80	5.26
							.549***	14.26	2.60
							.470***	13.95	2.76
							.412***	13.66	3.96
							.054	10.80	5.04
-							.379***	14.39	3.25
.169*	-						.361***	11.49	4.88
.324**	.037	-					.415***	14.44	2.62
.097	.201*	.216**	-				.384***	13.24	3.98
.364**	.127	.266**	.288**	-			.396***	13.01	4.14
.036	.160*	.192*	.349**	.178*	-		.338***	13.36	3.68
.168*	.306**	.228**	.343**	.155*	.163*	-	.438***	13.63	3.41

Table 70. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite salience scale for composite salience scale for full-time subgroup (n_2=71)

Scale Item	Inter-item Correlation Coefficients										
1	-										
2	.432**	-									
3	.349**	.186	-								
4	.286*	.551**	-.001	-							
5	.061	.251*	-.000	.448**	-						
6	.376**	.296*	.146	.344**	.366**	-					
7	.062	.158	.155	.196	.402**	.258*	-				
8	.025	-.016	.012	.024	.124	.409**	.151	-			
9	-.035	-.070	-.071	-.002	.160	.163	.148	.247*	-		
10	.435**	.206	.085	.269*	.190	.641**	.166	.509**	-.040	-	
11	.209	.197	.166	.496**	.505**	.188	.235*	.299*	-.097	.472**	
12	.044	.111	-.001	.518**	.486**	.316**	.542**	.182	.234**	.086	
13	.003	.144	.017	.487**	.284*	.166	.272*	.079	.173	-.036	
14	-.036	.190	.138	.339**	.349**	.353**	.121	.252*	.188	.126	
15	.069	.074	.056	.202	.322**	.227*	.456**	.023	.194	.135	
16	.203	-.078	.121	.150	.228	.233*	.213	.226	.140	.329*	

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .2500.

Inter-item Correlation Coefficients						Corrected Item-total Correlations	Item Means	Item Standard Deviations
						.296***	15.59	1.37
						.296***	13.55	4.01
						.146	14.13	3.52
						.568***	15.06	2.64
						.554***	11.93	4.81
						.581***	14.75	2.79
						.456***	14.22	2.46
						.345***	14.29	3.51
						.170	12.31	4.81
						.422***	14.44	3.64
-						.529***	13.13	4.18
.264*	-					.560***	14.65	2.81
.221	.607**	-				.424***	14.00	3.61
.157	.348**	.463**	-			.443***	12.25	5.42
.377**	.286*	.117	.133	-		.410***	13.98	3.27
.459**	.190	.178	.151	.523**	-	.415***	13.55	3.45

Table 71. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite salience scale for composite salience scale for localite subgroup (n_1=132)

Scale Item	Inter-item Correlation Coefficients										
1	-										
2	.163	-									
3	.198**	.063	-								
4	.105	.266**	.026	-							
5	-.010	-.011	.128	.162	-						
6	.223*	.278**	.114	.270**	.286**	-					
7	.118	.139	.106	.364**	.202*	.360**	-				
8	.100	.178*	.153	.306**	.140	.329**	.239**	-			
9	.067	.052	.154	-.038	-.047	.048	-.024	.060	-		
10	.104	.189*	.132	.367**	.124	.476**	.047	.230**	-.080	-	
11	.059	.179*	.177*	.162	.269**	.272**	.247**	.193*	-.056	.188*	
12	.073	.102	.009	.624**	.240**	.161	.434**	.257**	-.007	.310**	
13	.076	.100	.016	.149	.192*	.238**	.164	.037	.044	.086	
14	-.020	.138	.029	.365**	.066	.306**	.220*	.357**	-.098	.446**	
15	.077	.046	.145	.232**	-.002	.173	.278**	.102	.301**	.011	
16	.119	.153	.064	.227*	.211*	.434**	.340**	.183*	.004	.169	

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .2500.

Inter-item Correlation Coefficients					Corrected Item-total Correlations	Item Means	Item Standard Deviations
					.193	15.00	2.36
					.269***	12.03	4.65
					.220	13.86	3.62
					.498***	14.37	2.74
					.263***	10.52	5.22
					.579***	13.94	2.93
					.448***	13.61	2.95
					.402***	13.37	4.11
					.048	.066	4.96
					.384***	14.32	3.35
-					.329***	11.67	4.70
.045	-				.427***	14.25	2.84
.165	.217*	-			.347***	13.16	4.05
.024	.268**	.239**	-		.356***	12.67	4.36
.127	.209*	.350**	.135	-	.351***	13.13	3.87
.269**	.192*	.359**	.209*	.139** -	.464***	13.33	3.38

Table 72. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite salience scale for composite salience scale for cosmopolite subgroup (n_2=108)

Scale Item	Inter-item Correlation Coefficients								
1	-								
2	.175	-							
3	.313**	.145	-						
4	.411**	.423**	.153	-					
5	.148	.215*	.174	.392**	-				
6	.299**	.170	.122	.395**	.350**	-			
7	.115	.131	.081	.229*	.205*	.406**	-		
8	.184	.011	.048	.149	.114	.184	.262**	-	
9	.155	-.031	-.100	.028	.086	.254**	.168	.152	-
10	.319**	.240*	.478**	.301**	.230*	.280**	.184	.294**	-.077
11	.216*	.093	.129	.421**	.547**	.303**	.147	.256**	-.004
12	.098	.158	.096	.505**	.260**	.332**	.435**	.192	.163
13	.075	.123	.095	.445**	.307**	.189	.298**	.176	.135
14	.114	.066	.188	.338**	.299**	.147	.251**	.299**	.214*
15	.222*	.015	.180	.194	.178	.274**	.456**	.054	.033
16	.141	-.012	.039	.150	.337**	.272**	.236*	.344**	-.068

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .2500.

Inter-item Correlation Coefficients						Corrected Item-total Correlations	Item Means	Item Standard Deviations
						.380***	15.33	1.68
						.221	13.37	3.92
						.259***	14.17	3.92
						.592***	15.15	2.27
						.526***	11.89	4.97
						.509***	14.97	2.18
						.456***	14.55	2.20
						.354***	14.42	3.41
						.120	11.96	4.99
-						.404***	14.50	3.38
.325**	-					.517***	12.35	4.77
.152	.172	-				.489***	14.80	2.44
.015	.276**	.492**	-			.459***	13.83	3.65
.079	.221*	.324**	.448**	-		.438***	12.92	4.81
.141	.350**	.209*	.186	.179	-	.346***	14.05	3.10
.276**	.414**	.232*	.197*	.089	.151 -	.359***	13.93	3.44

APPENDIX G: ROLE TENSION

Role tension is operationalized on the basis of the local civil defense directors' responses to the following question.

1. If a problem comes up in your civil defense work and it isn't all settled by the time you go home, how likely is it that you will find youself thinking about it after work?

Code	Response
00	= Not likely, Certainty 5
03	= Not likely, Certainty 4
05	= Not likely, Certainty 3
06	= Not likely, Certainty 2
07	= Not likely, Certainty 1
08	= Uncertain or don't know
09	= Likely, Certainty 1
10	= Likely, Certainty 2
11	= Likely, Certainty 3
13	= Likely, Certainty 4
16	= Likely, Certainty 5

APPENDIX H: ROLE PERFORMANCE

The specific questions for this variable are not presented, but rather the seven task areas and criterion weights assigned to each of the task areas by civil defense superiors are presented to illustrate the procedure utilized in developing the role performance scores. For a complete description of these items see Klonglan et al. (1966: 57-95).

Role performance items

Task area 1. Licensing, marking and stocking of eligible buildings.

Task area 2. Public information activities.

Task area 3. Emergency services 1 (warning services and radiological defense services).

Task area 4. Direction and control consisting of two subtasks: establishing an emergency operating center and arranging for the use of emergency radio communication system.

Task area 5. Establishing a basic operational survival plan.

Task area 6. Training and public education.

Task area 7. Emergency services 2 (assigning other emergency services to other individuals and agencies in the civil defense area).

A Paired Comparison Role Performance Score for each director is obtained by assigning relative weights to each task as delineated by federal civil defense personnel. The weights vary from 7 for the most important task (licensing, marking, and stocking) to 1 point for the least important task (emergency services 2). These weights are then multiplied

by the degree of achievement for each task which could range from 0 to 100. An example for a hypothetical local civil defense director is illustrated below.

	Role Expectations or Tasks							
	1 Licensing, Marking, Stocking	2 Public Information	3 Emergency Services 2	4 Direction and Control	5 Operational Plan	6 Training and Education	7 Emergency Services 2	8 Total Score
Weights	7.0	3.0	2.0	6.0	5.0	4.0	1.0	
Raw Task Score (Achieved)	100	40	0	20	20	38	0	
Product (Row 1 x Row 2)	700	120	0	120	100	152	0 =	1192

Total role performance score: Sum products across seven task areas (row 3).

Potential role performance score: 0 to 2800.

Table 73. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite role performance scale for total research sample (N=240)

Scale Item	Inter-item Correlation Coefficients							Corrected Item-total Correlations	Item Means	Item Standard Deviation
1	-							.042	561.75	228.29
2	.069	-						.555***	74.20	71.49
3	-.064	.244**	-					.330	115.35	49.45
4	-.061	.389**	.444**	-				.434***	269.42	172.77
5	.137	.496**	.257**	.469**	-			.544***	360.00	202.66
6	.026	.748**	.326**	.481**	.449**	-		.554***	76.92	76.06
7	-.072	.405**	.309**	.530**	.420**	.439	-	.472***	66.51	27.05

** Significant at .01 level.

*** Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3787.

Table 74. Correlation matrix, corrected item-total correlations, item means and item standard deviations for composite role performance scale for educational subgroup with 12 or less years of formal education (n_1=123)

Scale Item	Inter-item Correlation Coefficients							Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-							.008	579.86	217.24
2	.052	-						.570***	68.73	67.02
3	-.131	.168	-					.259	107.85	50.37
4	-.011	.367**	.381**	-				.514***	257.41	169.27
5	.052	.451**	.262**	.537**	-			.519***	347.97	207.38
6	.003	.737**	.215*	.483**	.457**	-		.545***	66.94	65.85
7	-.073	.406**	.331**	.564**	.375**	.479**	-	.479***	62.46	29.92

** Significant at .05 level.

*** Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3787.

Table 75. Correlation matrix, corrected item-total correlations, item means, and item standard deviations for composite role performance scale for educational subgroup with more than 12 years of formal education (n_2=117)

Scale Item	Inter-item Correlation Coefficients						Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-						.093	542.71	238.81
2	.097	-					.592***	79.95	75.78
3	.029	.305**	-				.399***	123.23	47.42
4	-.096	.402**	.504**	-			.361	282.05	176.22
5	.235**	.538**	.237**	.393**	-		.569***	372.65	197.67
6	.063	.756**	.403**	.476**	.444**	-	.565***	87.42	84.51
7	-.046	.407**	.239**	.490**	.483**	.402**	- .471***	70.77	23.04

** Significant at .01 level.

*** Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3878.

Table 76. Correlation matrix, corrected item-total correlations, item means, and item standard deviations for composite role performance scale for rural subgroup (n_1=88)

Scale Item	Inter-item Correlation Coefficients							Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-							.057	568.99	247.23
2	.030	-						.420***	31.50	43.54
3	-.082	.307**	-					.400***	109.52	47.29
4	.008	.278**	.424**	-				.422***	190.02	159.91
5	.135	.457**	.456**	.457**	-			.490***	231.82	217.90
6	-.037	.480**	.451**	.399**	.320**	-		.373	26.68	31.73
7	-.111	.214*	.376**	.655**	.304**	.325**	-	.381	51.67	33.54

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3787.

Table 77. Correlation matrix, corrected item-total correlations, item means, and item standard deviations for composite role performance scale for composite role performance scale for urban subgroup (n_2=152)

Scale Item	Inter-item Correlation Coefficients						Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-						.072	557.56	217.31
2	.119	-					.491***	98.92	72.94
3	-.050	.218**	-				.286	18.72	50.51
4	-.097	.282**	.453**	-			.284	315.39	163.44
5	.206*	.350**	.089	.304**	-		.431***	.434.21	150.10
6	.071	.708**	.321**	.399**	.316**	-	.511***	106.00	79.08
7	-.019	.374**	.260**	.282**	.234**	.392**	- .341	75.10	17.53

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3787.

Table 78. Correlation matrix, corrected item-total correlations, item means, and item standard deviations for composite role performance scale for part-time subgroup (n_1=169)

Scale Item	Inter-item Correlation Coefficients						Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-						-.015	574.04	217.92
2	.021	-					.477***	57.48	60.47
3	-.107	.175*	-				.290	109.99	51.44
4	-.119	.335**	.435**	-			.414***	250.58	170.27
5	.124	.459**	.223**	.483**	-		.554***	344.97	208.43
6	-.061	.663**	.303**	.460**	.437**	-	.497***	62.86	60.46
7	-.150	.349**	.329**	.560**	.427**	.458**	- .461***	63.44	28.18

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3787.

Table 79. Correlation matrix, corrected item-total correlations, item means, and item standard deviations for composite role performance scale for full-time subgroup (n_2=71)

Scale Item	Inter-item Correlation Coefficients							Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-							.226	532.49	250.48
2	.244*	-						.661***	114.00	79.97
3	.091	.270*	-					.378	128.11	42.00
4	.100	.404**	.415**	-				.435***	314.28	171.58
5	.209	.582**	.309**	.397**	-			.527***	395.77	184.73
6	.201	.796**	.324**	.485**	.485**	-		.618***	110.37	96.79
7	.177	.457**	.136	.391**	.350**	.390**	-	.462***	73.82	22.70

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3787.

Table 80. Correlation matrix, corrected item-total correlations, item means, and item standard deviations for composite role performance scale for localite subgroup (n_1=132)

Scale Item	Inter-item Correlation Coefficients							Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-							-.026	584.98	218.01
2	-.031	-						.471***	51.02	57.46
3	-.119	.177*	-					.296	106.53	50.34
4	-.025	.372**	.386**	-				.506***	234.00	170.64
5	.044	.473**	.303**	.525**	-			.520***	303.79	219.09
6	-.097	.692**	.253**	.443**	.437**	-		.464***	51.76	55.23
7	-.124	.332**	.322**	.618**	.381**	.411**	-	.461***	58.82	31.08

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3787.

Table 81. Correlation matrix, corrected item-total correlations, item means, and item standard deviations for composite role performance scale for cosmopolite subgroup (n_2=108)

Scale Item	Inter-item Correlation Coefficients						Corrected Item-total Correlations	Item Means	Item Standard Deviations
1	-						.247	533.36	238.21
2	.245*	-					.564***	102.53	76.82
3	.050	.208*	-				.289	126.13	46.33
4	-.049	.314**	.463**	-			.282	312.72	166.09
5	.410**	.432**	.041	.278**	-		.539***	428.70	155.91
6	.196*	.724**	.318**	.457**	.379**	-	.579***	107.67	86.32
7	.130	.409**	.151	.271**	.297**	.424**	- .398***	75.92	17.03

*Significant at .05 level.

**Significant at .01 level.

***Exceeds minimum item-total criterion $1/\sqrt{k}$ = .3787.